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Business Model for a Solution Provider in Industrial Wireless Technologies

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Instructor: Marjatta Huhta, DSc (Tech)

PREFACE

Working on this study has been a challenging and at the same time rewarding journey. Attending the intense degree program alongside the day-to-day duties at work required prioritising the tasks at hand. However, at the end of this journey I am thrilled and proud to present my Thesis.

I would like to acknowledge my employer who kindly granted me the time to work on this Thesis. Especially I would like to thank Tryggve Mathiesen who provided me with many good ideas and inputs for this study.

This Thesis would not have been possible without the great dedication and support from my instructors Marja Blomqvist and Marjatta Huhta who provided me with the necessary guidance to steer this Thesis into the right direction. Thomas Rohweder and Zinaida Merezhinskaya further gave me much appreciated feedback regarding its content, structure and language.

I would dearly like to thank Sanna for her support and her patience while reviewing the Thesis and providing me with constructive feedback.

I am deeply grateful to everyone who contributed and supported me during my degree program. It was only due to the support of these people that I could develop myself and grow with the challenges at hand.

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ABSTRACT

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Wireless solutions have become part of everyday life in recent years. In industrial applications, wireless solutions provide an unprecedented form of flexibility; reduce complexity and help save costs.

The case company is a small consultant and design house, specialising in advanced microelectronics, which aims to become a solution provider for industrial wireless technologies. The case company's biggest challenge is the profitability. The current business model and customer value proposition (CVP) need to be analysed and re-engineered to address this challenge.

A new business model proposal is introduced, based on the aspects of relevant service business theories and business model theories. These frameworks elaborate on the customer value proposition, the costs, the resources and the processes. This business model proposal aims not only to increase the company's profitability, but also strives towards an increased customer value proposition.

Key words: business model, service business, service design, service productisation, wireless solution provider.

OPINNÄYTETYÖN TIIVISTELMÄ

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Langattomista ratkaisuista on tullut osa jokapäiväistä elämää. Teollisissa sovelluksissa langattomat ratkaisut tarjoavat ennennäkemätöntä joustavuutta, vähentävät monimutkaisuutta ja auttavat säästämään kustannuksissa.

Työn kohdeyrityksenä on pieni edistyneeseen mikroelektroniikkaan erikoistunut konsultti- ja suunnittelualan yritys jonka tavoitteena on ryhtyä teollisten langattomien sovellusratkaisujen tarjoajaksi. Yrityksen suurimpana haasteena on tuottavuus. Nykyistä liiketoimintamallia ja asiakaslupausmääritelmää on analysoitava ja suunniteltava uudelleen, jotta haasteeseen voidaan vastata.

Tässä työssä esitellään ehdotus uudeksi liiketoimintamalliksi. Ehdotuksen pohjana on käytetty palveluliiketoiminnan teorioita sekä liiketoimintamallien teorioita. Mallin puitteina ovat asiakaslupaus, kulut, resurssit ja prosessit. Liiketoimintamalliehdotus tähtää yrityksen kannattavuuden lisäämisen lisäksi myös asiakasarvon lisäämiseen

Avainsanat: liiketoimintamalli, palveluliiketoiminta, palvelumuotoilu, palvelujen tuotteistaminen.

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ABBREVIATIONS AND ACRONYMS

ASIC	Application Specific Integrated Circuit
Bluetooth	Proprietary Wireless Technology Standard
CRM	Customer Relationship Management
CVP	Customer Value Proposition
DSP	Digital Signal Processing
EDA	Electronic Design Automation
FPGA	Field Programmable Gate Array
HQ	Headquarters
HW	Hardware
ICT	Information and Communication Technologies
IP	Intellectual Property
MP3	Digital Audio Encoding Format Using Compression
NPS	Net-Promoter Score
OEM	Original Equipment Manufacturer
OS	Operating System
Qt	Cross-Platform Application Framework (also Q.T.)
R&D	Research and Development
RFID	Radio Frequency Identification
SDR	Software Defined Radio
SoPC	System on Programmable Chip
SW	Software
TFT-LCD	Thin Film Transistor Liquid Crystal Display
TTM	Time to Market
WLAN	Wireless Local Area Network
WPAN	Wireless Personal Area Networks
ZigBee	High-Level Communication Protocol Specification

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1 INTRODUCTION

Wireless solutions have long become part of everyday life. Industrial applications are increasingly moving towards wireless solutions, such as radio-frequency identification (RFID), ZigBee or Bluetooth to name a few. Industries favour different standards, or derivations of standards, to address different challenges and needs. Despite the lack of common standards, however, there are similarities across most applications. System relevant information needs to be reliably transmitted and received while its content can be anything – from a simple remote light switch to a complex transceiving (transmitting and receiving) of system relevant data in an industrial application.

Industrial wireless applications differ from consumer applications in many aspects. Industrial wireless applications have to be robust, reliable and safe. Some applications need to protect sensitive data from possible hacker attacks. Other industrial wireless applications have to comply with tough environments. Examples of requirements for industrial products range from electromagnetic interference (EMI) requirements, extreme temperatures, dust and moist, chemical liquids to aggressive fumes. A hiccup, misinterpretation or even failure of a wireless link in an industrial environment can potentially be disastrous. A failing sensor communication can damage material and machines. In the worst case, a failing sensor can even endanger human lives.

In spite of the challenges, industrial wireless technologies offer new opportunities and provide a great number of advantages such as an unprecedented level of flexibility. At the same time, industrial wireless solutions reduce complexity and help save costs.

1.1 Case Company Background

The case company is a small consultant and design house, specialising in industrial wireless solutions, microelectronics, embedded processing, software design and programmable logic design (such as field programmable gate arrays; FPGAs). The company employs about 40 design engineers and offers electronic design and consulting services. In addition, the company offers services to conduct feasibility studies and provides development/prototyping platforms.

The biggest challenge of the current business model is the profitability, according to the company's senior management. The hourly rates for billable electronic design and consulting services are stagnating. The nature of the hourly billable design services also makes it difficult to re-use results of developments and products. Therefore, technological expertise of the employees cannot be utilised by the organisation. The employees are working primarily at the customer site and hence, knowledge transfer is limited among the employees.

The company anticipates an increased demand for industrial wireless solutions and acknowledges the potential that lies in this technology. Currently, wireless solutions can be based on many standards. The company is too small to create or define its own industrial-wide standards. However, the company can provide different custom-made solutions utilising different standards and protocols.

1.2 Research Objective and Research Question

Industrial wireless solutions create business opportunities for the company, according to the company's senior management. The company has expertise in industrial wireless technologies. The nature of wireless solutions allow for a certain degree of modularity. Small companies, such as the case company, can profit from this modularity. A company can specialise in aspects of industrial solutions and does not require expertise in complete systems. However, the company faces a big challenge – the profitability of the current business model. The ongoing efforts to improve the productivity and profitability are not addressing the problem sufficiently. Therefore, it is necessary to look at the problem from a bigger, more holistic perspective. Hence, this study aims to find an answer to the following research question:

How to improve the case company business model to become a solution provider in industrial wireless technologies?

The company aims to become a solution provider in industrial wireless technologies. The research question tackles the challenge of making profit as a service provider in industrial wireless markets.

1.3 Research Method and Material

The research is based on qualitative research. In this study, action research is the main research approach. Definition and terminology are derived from Päivi Eriksson and Anne Kovalainen's book on qualitative research methods (Eriksson, Kovalainen 2008). Action research is a cyclical process of *planning*, *taking action* and *evaluating,* which leads to further planning. The planning phase *unfreezes* the current situation by questioning and analysing the current state. The action phase *changes* existing models of behaviour while new models are being learned. Finally, the action research cycle is completed with the evaluation phase, at which the newly learned

behaviour *re-freezes*, before the action research re-enters the next cycle. Figure 1 illustrates a simplified action research cycle (Eriksson 2008: 196).

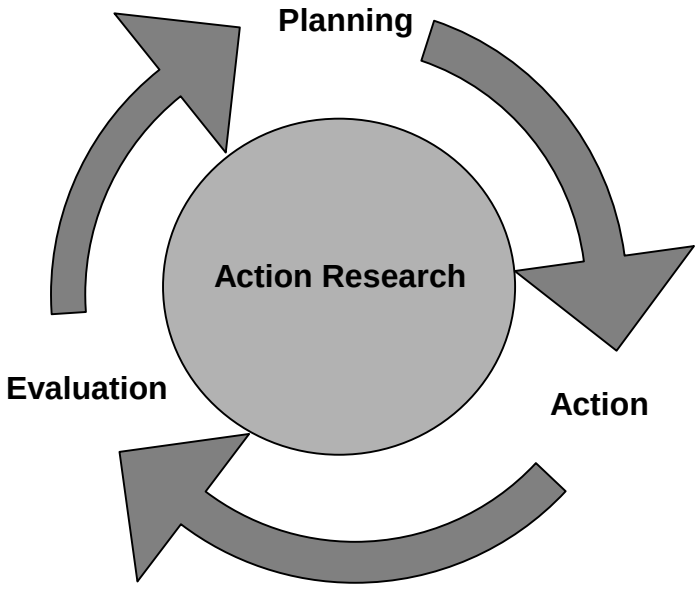

Figure 1. Simplified action research model (Eriksson 2008: 196).

The action research conducted in this study combines several methods and techniques of analysis to validate the findings. The material used to conduct the case company analysis utilises multiple sources of data, such as the current state analysis, internal stakeholder interviews, peer interviews, industry benchmarks and the researcher's own observations. These sources ensure triangulation of research data. The results of the case company analysis and the elaborated theory lay foundation for a business model proposal draft. A second round of interviews is conducted to verify the business model draft and to gather feedback. The final business model proposal is created, based on the business model draft and the results from the second round of stakeholder interviews.

1.4 Scope and Structure of the Study

The goal of this study was to develop a business model for solution providers in industrial wireless technologies and to address the company's biggest challenge, the profitability. The scope and intention of this Thesis was not to provide a ready-made solution, but to develop a well-grounded business model proposal based on the existing business model frameworks; important aspects of service business theories; the case company analysis; professional experience from senior experts, and observations made by the researcher. The business model proposal offers a list of managerial implications aimed at implementing the business model proposal into practise.

The structure of this Thesis comprises of seven main Sections: 1) Section 1, introduces the research question, research problem, method and materials of the study. 2) Section 2 elaborates on the aspects of service business theories and service business strategies. Further, Section 2 develops a tailored business model framework based on the existing business model theories. 3) Method and material used in this study are discussed in the Section 3. 4) The results from the current state analysis, the internal stakeholder interviews, the peer interviews, the industry benchmarks and the researcher's observations are analysed in Section 4. 5) Section 5 analyses the current business model and introduces a business model draft. 6) The business model draft is verified based on a second round of internal stakeholder interviews in Section 6. In the same Section, the final business model proposal is introduced and managerial implications are discussed. 7) The outcome, limitations, reliability considerations and the follow-up suggestion are discussed in Section 7.

2 BUSINESS MODEL FOR SERVICE BUSINESSES

This Section elaborates on the body of existing knowledge in order to lay the theoretical foundation necessary to conduct this research. Important aspects of service business and service business strategy theories, as well as existing business model frameworks, are discussed to develop a business model framework, tailored to the company needs. Table 1 illustrates the approach used for developing the business model framework for the case company:

Service Businesses *Section 2.1*	
Service Business Ecosystems *Section 2.1.1*	Productivity for Service Business *Section 2.1.2*
↓	↓
Service Business Strategy *Section 2.2*	
↓	
Business Model Frameworks *Section 2.3*	
↓	
Tailored Business Model Framework *Section 2.4*	

Table 1. Approach to develop a business model framework.

Table 1 illustrates that aspects of *service business* and *service business strategy* theories are used to complement the new business model framework. Johnson's (2003) *framework for re-engineering a*

successful business model provides the basis for the tailored case company business model framework. In addition, this business model framework also uses certain aspects from Osterwalder's (2009) *business model canvas* and Chesbrough's (2002) business model framework.

2.1 Service Business

A firm, such as the case company, providing both goods and services, should consider itself a service business (Webster 1994). In the past years, a mindset change has been observed that moves away from the traditional goods-centred dominant logic towards a service-centred dominant philosophy, even within traditional production and goods-centred industries. Successful service companies, which adopt this new mindset, can be observed across almost all industries (Vargo 2004: 1-2).

Kotler (2003) distinguishes five types of services: 1) pure tangible goods, 2) tangible good with accompanying services, 3) hybrids and major services with accompanying minor goods, 4) services, and 5) pure services (Kotler 2003: 445-446). According to Vargo (2004), the primary *unit of exchange* in the goods-centred dominant logic are goods; whereas it is the exchange of *knowledge and skills* in the service-centred dominant sectors. The *role of goods* in the goods-centred dominant logic are *operand* resources, which change its form, place and possession; while in the service-centred dominant logic goods are *operant* resources, intermediate products, used by other operant resources. Accordingly, the *role of the customer* varies depending on the perspective. While the customer is simply the *receiver* in the goods-centred dominant logic, in the service-centred dominant sectors, the customer is part of the *process.* Ideally, the customer is even involved as a *co-producer of services*. (Vargo 2004: 5-6)

The definition of the *value of goods* is yet another aspect which illustrates the fundamental difference between the two domains. In the goods-centred logic, the value of goods is *determined* by the producer and is seen as the *exchange value;* whereas in the service-centred logic, the value is *perceived* by the customer as a *value in use* (Vargo 2004: 6). In service business, the value is not produced in the factory, but created in interaction with the customers (Grönroos 2000: 24).

Service Business Background

By looking at the historical evolvement of economies, it becomes evident that breakthrough innovations (like the invention of the steam engine, which triggered the industrial revolution) lead to a paradigm change. The new inventions changed the entire business environment. Inventions in the ICT sector and increasing automation in Western economies lead to a service revolution, comparable to the industrial revolution triggered by the invention of the steam engine. (Vargo 2004: 4)

Historically speaking, the timeline of radical paradigm changes can be roughly split into three parts: The pre-1900 era, the 20th century, and the 21st century. In the pre-1900 era (classical and neoclassical economies roughly from 1800-1920), the goods-centred model of exchange focuses on tangibles, statistics and operand resources. In the first half of the 20th century, the industry shifted its focus mostly to commodities. Some companies, however, began to steer away from *tangible outputs* towards a *dynamic exchange of relationships* that involved skills, knowledge and services. In the early 1950s, a new management school of thought started focusing on the customer. It was not until the 1980s, however, that the school of social and economic process started to emerge. This school of thought continues to develop into the 21st century. The service-centred model of exchange focuses on intangibles, competences, customer relationships and the exchange of processes (Vargo 2004: 4). According to Quinn (1999), services are often *consumed* at the time of

production (Quinn 1999). The emerging ICT technologies, however, enable new opportunities. Services can be *stored* and *embedded* in products (Meuter 2000: 50; Auguste 2006: 43).

2.1.1 Service Business Ecosystem

Understanding the business ecosystem of a company is extremely important. Each member in a business ecosystem ultimately shares the fate of the whole network regardless of size or dominance. Business ecosystems exist in almost all industries. Ignoring a company's business ecosystem can have severe consequences. Companies form alliances and partnerships, collaborate on projects and leverage their synergies. Examples of business ecosystem can be found in everyday life. The farmers' competence, for instance, lies in producing raw goods such as milk, meat or potatoes. The distribution, however, is delegated to grocery stores. The complexity of a business ecosystem, however, can be very complex and is not always that obvious. The underlying network of alliances and partnerships becomes apparent, if a business ecosystem fails to work. The importance of ecosystems becomes evident, if the ecosystem is disturbed and gets out of balance. In order to engineer a good strategy, it is important to investigate when and why a business ecosystem either flourishes or fails. (Lansiti 2004: 69-70) A working business ecosystem allows service businesses to utilising alliances and partnership networks that help improve the customer value proposition and increasing the revenue (Osterwalder 2009: 118-119).

Assessing the Service Business Ecosystem

When moving from a manufacturing perspective to a service perspective, the focus of management changes from a product perspective to a *total* perspective (Grönroos 1990: 117-118). Lansiti's business ecosystem matrix, introduced in Figure 2, helps to assess the business ecosystem from the perspective of innovations and relationships (Lansiti 2004: 74):

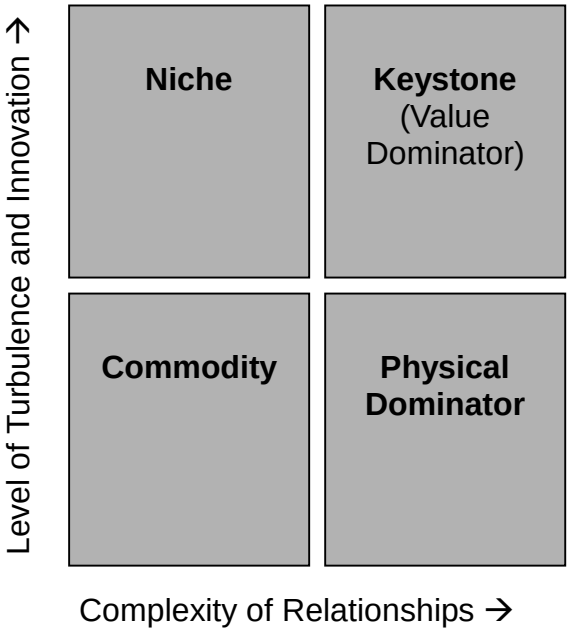

Figure 2. Business ecosystem matrix (Lansiti 2004: 74).

Lansiti's business ecosystem matrix (Figure 2) suggests that companies with a low level of turbulences and innovations are destined to be commodity companies. A sophisticated network of alliances and relationships, however, allows the companies to increase their influence within the business ecosystem. Successful companies eventually become physical dominators. When the level of turbulences and innovations is intense, a company can be either a niche company or a business ecosystem's keystone. The keystone company is the value dominator of its business ecosystem. Typically, a keystone company has a high level of innovation and nourishes complex alliances and partner networks. Microsoft is an example of a successful keystone company that dominates the value creation. Microsoft utilises complex alliances and partner networks to offer innovative technologies to various third-party organisations. As a keystone company, Microsoft can influence the whole business ecosystem. It is crucial, however, that a keystone company uses its dominance responsibly. If a keystone company fails to maintain a balance between dominance and profits, it can so happen that an

entire business ecosystem comes to a standstill. The dominance of AOL and Yahoo, for instance, contributed to the burst of the dot-com bubble in the early 2000s. eBay, on the contrary, works with very low margins compared to the market average of retail business, and hence facilitates a healthy and diverse business ecosystem (Lansiti 2004: 74-75). Small niche companies, such as the case company, will have to carefully assess the industry's business ecosystem and identify the role of the value dominator when designing their services.

Assessing the Business Environment

A company has to investigate the forces that impact the company's business environment. Innovations in the field of ICT create opportunities for disruptive technologies that change the basis of competition in an industry (Christensen 1997). Porter's *five forces that shape the competition* framework are introduced in Figure 3 to help assess the business environment. This framework complements Lansiti's (2004) business ecosystem matrix. Porter's framework offers a differentiated analysis of different aspects within the business environment. The rivalry among existing competitors is at the very core of this framework, surrounded by threats, such as the threat of new entrants, the threat of substitutes and the bargaining power of both, the suppliers and the buyers (Porter 2008: 4).

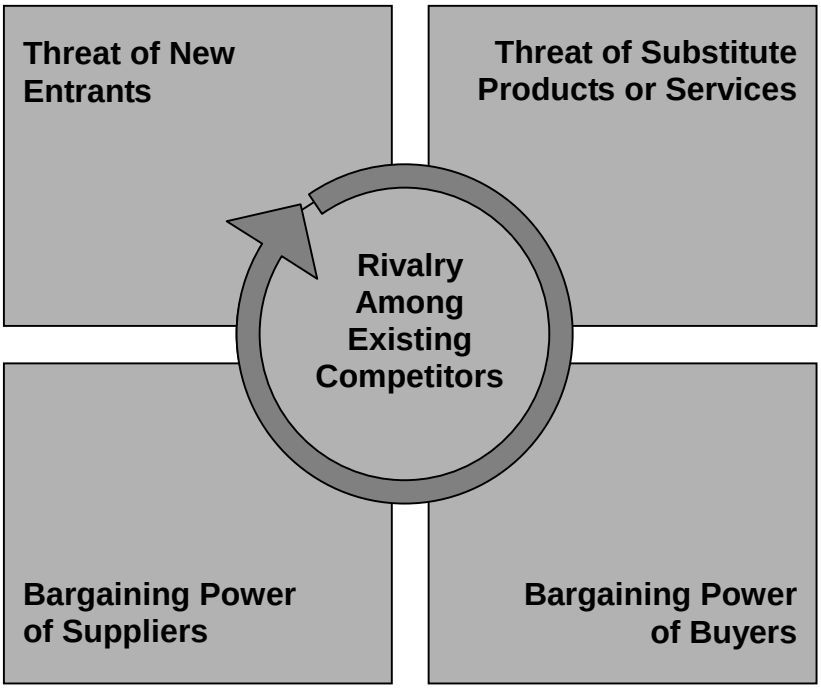

Figure 3. Five forces that shape the competition (Porter 2008: 4).

Figure 3 illustrates Porter's framework of the five forces that shape the competition. The five forces help assess the business environment of a company. For instance, the rivalry *among existing competitors* depends on the profitability and growth rate of a particular industry – high margins and the growth rates may allow rivals to comfortably coexist. High margins, however, also attract *new entrants*, companies trying to penetrate the market. The threat of new entrants, however, does not only depend on the industry's margins. These hurdles to enter a new market vary for each industry. Before penetrating a new market, new entrants need to consider its requirements. (Porter 2008: 5-6)

The economy of scale, on the demand and supply side of a business environment, needs to be considered in order to assess the *bargaining power of suppliers and buyers*. The negotiating power of suppliers and buyers is very specific to each industry. A careful analysis of suppliers and buyers also helps to evaluate future trends of the business environment, based on the current developments.

Geographical location, government policies, brand, alliances, intellectual property and know-how are further potential aspects to be considered, as well as the access to distribution channels (Porter 2008: 5-6; Lansiti 2004: 74).

The threats of substituting products or services are often difficult to identify (Porter 2008: 5-7). Inventions in the ICT sector create the opportunity for new services that can be *embedded* in products (Meuter 2000: 50; Auguste 2006: 43), and have the potential to revolutionise an entire industry (Vargo 2004: 4).

2.1.2 Service Business Profitability and Productivity

Profitability and productivity can be challenging for service business companies such as the case company. The units of exchange, for service business companies, are often intangibles such as knowledge and know-how rather than tangible products or materials. Schmenner (2004) suggests a framework that can be applied to both, intangibles and tangibles: The theory of *swift, even flow* (Schmenner 2004: 335). This theory has its origins in the manufacturing of goods. The theory states that the more swift and even the flow of materials (or information) in a process is, the more *productive* the process becomes. Hence, the productivity increases linear to the speed that materials (or information) flow through a process. There is value added to the material (or information) while passing through a process. The time, however, it takes to pass is seen as a *waste of time* that manifests itself in overproduction, waiting, transportation, additional processing steps, inventory, motion or defects. According to Schmenner (2004), neither the speed, at which value is added, nor the capital intensity of the process increase productivity. These factors, however, help to increase the flow of material (or information), which leads to increased productivity. (Schmenner 2004: 335) Figure 4 illustrates Schmenner’s service process matrix:

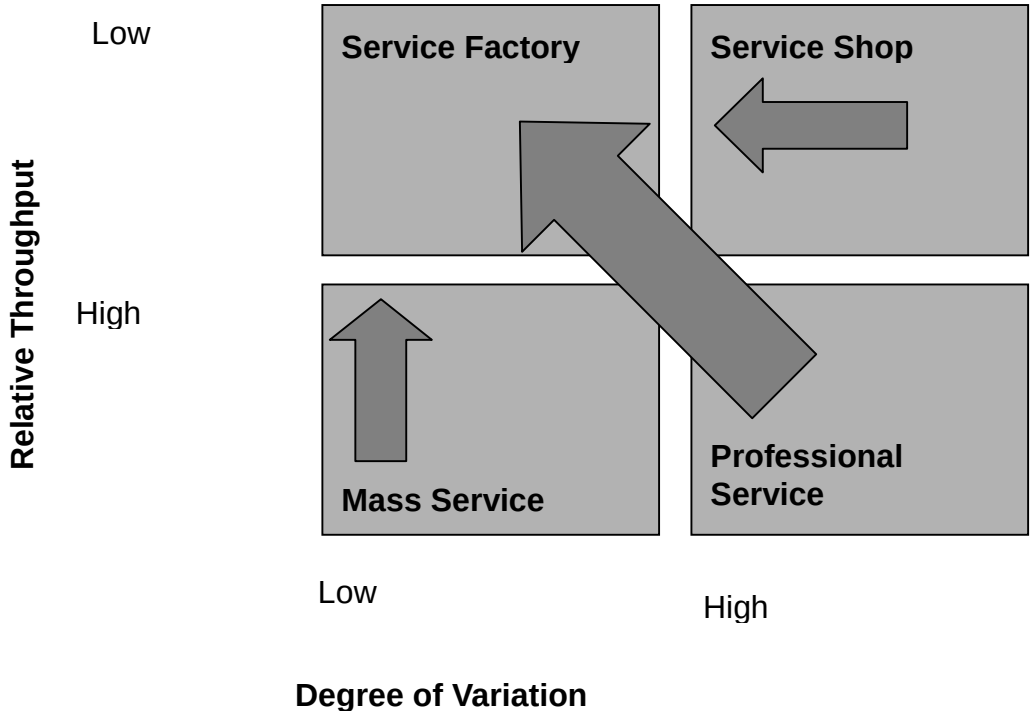

Figure 4. Service process matrix (Schmenner 2004: 339).

The service process matrix illustrated in Figure 4 adds, in addition to the dimension of speed (relative throughput time), the dimension of variation (degree of variation). The arrows indicate the direction towards the increased productivity. It is important to note, however, that the matrix does not examine *profitability*. Service business companies can be profitable anywhere within the matrix (Schmenner 2004: 339). Moreover, striving for productivity by moving towards a service factory can create challenges for companies, such as the case company, that try to escape the outsourcing and offshoring paradigm by offering complex and customised services (Karmarkar 2004: 102).

Reflecting upon the throughput time (the time between availability and completion off a service encounter) shows that service processes can be divided into a back office and a front counter part. An airplane, for instance, is in a front counter process while flying and in a back office process when on the ground. The front counter and back office processes for airplanes are sequential and cannot be executed simultaneously. There are, however, examples of services, where front

counter and back office processes can be executed simultaneously. Fast-food restaurants, for example, can prepare food before the actual orders. This is possible because of a *limited level of variation*. This simultaneous execution of front counter and back office processes results in a reduced throughput time and hence leads to increased productivity (Schmenner 2004: 340-41). This principal can be applied to other service business companies as well. The case company, for instance, can simultaneously develop a new product and design the add-on and embedded services for the same product. This simultaneously increases the productivity and the customer value proposition, and ultimately helps to reduce the threat of offshoring (Karmarkar 2004: 102).

2.2 Service Business Strategy

Section 2.1 introduced the concepts of service business, service business environments and service business productivity. In order to develop a strategy, however, a thorough understanding and analysis of service businesses and business ecosystems is vital. Therefore, Section 2.2 elaborates on the strategy considerations for service businesses. Companies have to constantly re-invent themselves and find ways to stay ahead of their competitors. The following Section introduces a series of frameworks that help assess the current strategy and provide tools to develop new strategies.

2.2.1 Strategy in a Changing Business Environment

Globalisation changes the business environment. Service operations in Western economies have come increasingly under pressure due to a high grade of automation, outsourcing and offshoring. Standardised processes create the opportunity for outsourcing. Simple services are often offshored to low-cost countries (Karmarkar 2004: 101-102). Services can range from very simple services to very complex services, while the degree of customisation differs significantly for different processes (see, Figure 5):

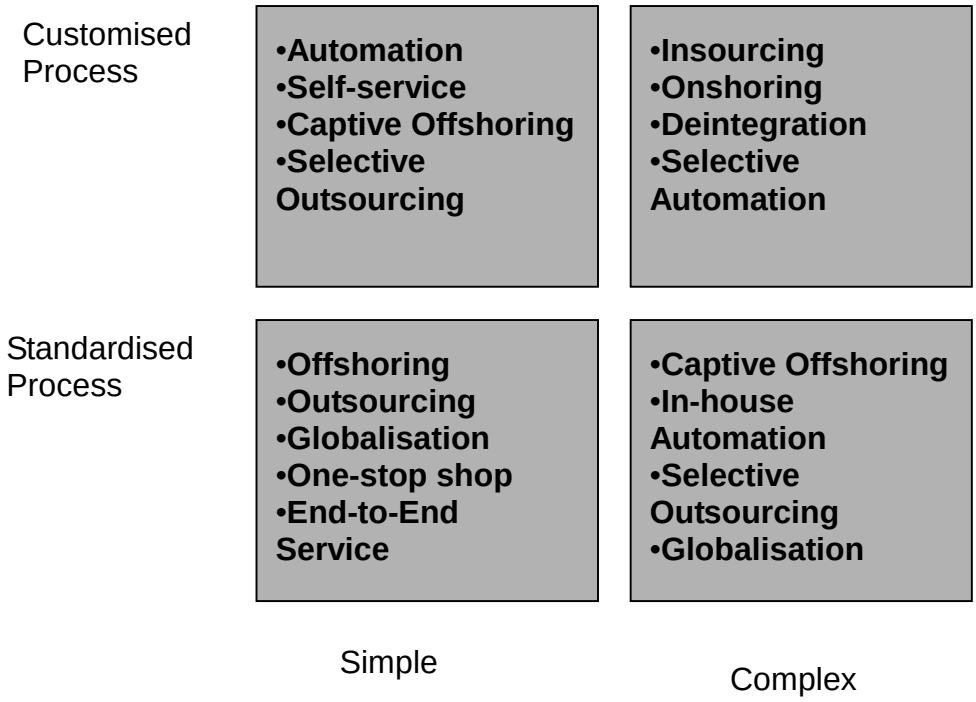

Figure 5. Strategy matrix (Karmarkar 2004: 102).

Karmarkar's strategy matrix in Figure 5 illustrates the threat of outsourcing and offshoring to simple services. Companies that offer complex services, however, are less likely to outsource or offshore their services. Furthermore, it appears that highly customised processes can create an opportunity for *insourcing* or *onshoring* operations. Therefore, companies in Western economies have to focus on more complex services and customised processes in order to adapt a changing and globalised business environment. Developing complex services and highly customised processes, however, require a thorough understanding of customers and their needs. To address this challenge, companies should co-operate with the customer. The customer should be even involved in the development of new services (Karmarkar 2004: 101-102). Karmarkar's strategy matrix shows a resemblance with Schmenner's service process matrix (Schmenner 2004: 339). There is a dilemma between striving for increased productivity, on the one side, and the threat of outsourcing and offshoring, on the other. Outsourcing is the acquisition of value-

creating activities from an external supplier (Hitt 2001). Service business companies, such as the case company, therefore, add best value to the customer by offering customer value propositions with *complex* services and *customised* processes.

Good examples of successful companies that offer complex services and highly customised processes can be found among traditional service providers. ICT technologies create an opportunity for new service offerings (Meuter 2000). Some traditional *front desk* services, for instance, can be offered online. Airlines, for instance, add more complex services beyond their traditional offerings. Their customers are often given a choice to select their seat, check-in, rent cars, book hotels or even shop online. The online ticket sale, for instance, has been a substitute method for discount airlines to work around the traditional sales channels such as travel agencies. The traditional airlines, however, adapted quickly and copied the idea (Karmarkar 2004: 105). Therefore, online ticketing is a substitute service that has changed the whole airline industry, similar to the Internet banking and online shopping. (Porter 2008: 4)

Future service businesses will have to continuously re-invent themselves in order to offer more personalised services. This requires permanent change and adjustment. A company has to be always one step ahead of its competitions – especially in an environment where the pace is permanently increasing. In order to escape the *o-word* paradigm of outsourcing and offshoring, Karmarkar suggests *r-words* instead, like re-aligning strategy, re-designing processes and re-structuring the organisation to guide businesses towards success and profitability. The above strategy matrix is a hands-on framework that can help analyse and re-engineer strategies in an ever evolving business environment. (Karmarkar 2004: 106-107)

2.2.2 Strategy in a Skill Based Economy

Inventions in the ICT sector has led to a service revolution (Vargo 2004: 4). The future for skill-based economies lays in *embedded services* (Auguste 2006: 44; Meuter 2000: 50). Even though embedded services do not yet account for the industry's biggest profit, they are by far the fastest growing segment across many industries. However, while certain service strategies work for some products, they might fail for other offers. Figure 6 illustrates a framework that can help explain this phenomenon (Auguste 2006: 44):

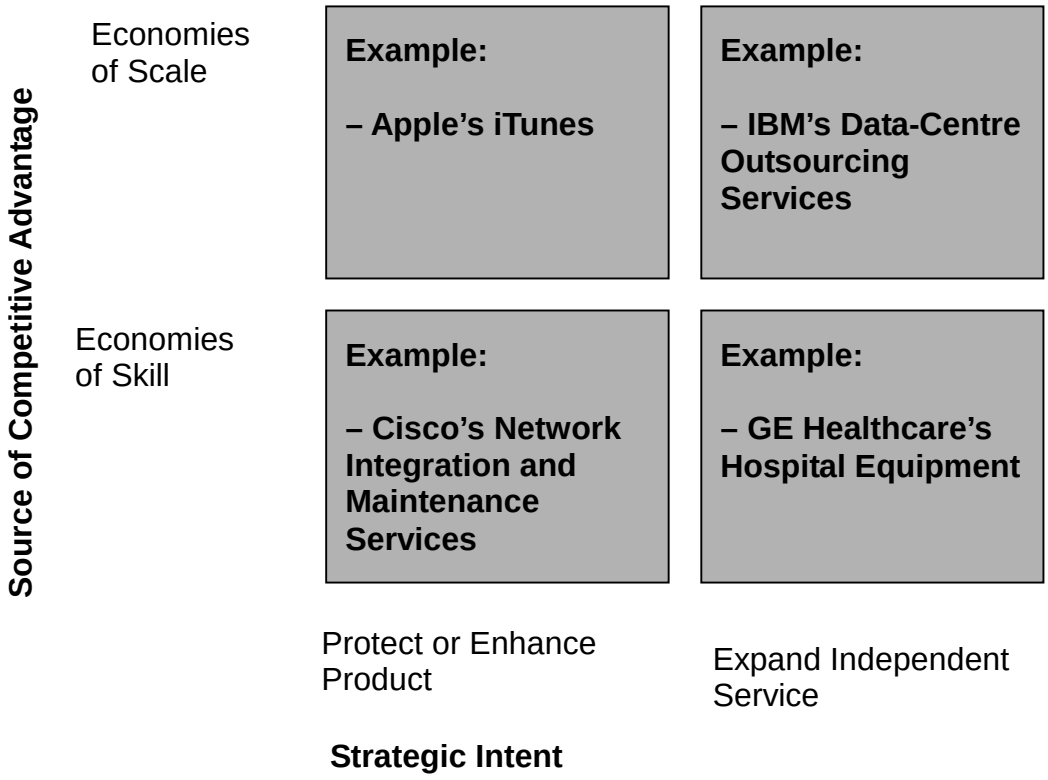

Figure 6. Economy of scale and economy of skill (Auguste 2006: 44).

Embedded services can create a competitive advantage for products and create differentiation. The perceived value of the services, however, may vary. Figure 6 illustrates the examples of different companies and their service offerings: for instance, Apple, a representative for the economy of scale, offers iTunes as a free service. In return, the company profits from selling MP3 players. GE

Healthcare, however, operates in a typical economy of skill. The embedded services of the hospital equipment require extensive personal interaction and exchange of knowledge with the customer (Auguste 2006: 44). The case company, too, operates in an economy of skill, intending to expand its service portfolio. Developing a competitive strategy would require to elaborate on the company attempts to develop a sustainable competitive advantage, for example, by means of developing a new cost, differentiation, or niche strategy (Chesbrough 2002: 3-5).

2.2.3 Strategy and Weak Signals

According to Schoemaker (2009), it is necessary to utilise *weak signals* in order to create a good strategy. When the global finance and banking system collapsed in 2008, it seemed that no one was prepared and every one was taken by surprise. Experts, however, were warning about the inevitable crash long before it happened. This dramatic example illustrates a problem that can be observed, although on a scale of smaller magnitude, across all industries. Week signals are often ignored due to personal bias, group dynamics, wrong beliefs, company cultures, or simply because the signals make no sense. Table 2 illustrates a three-step framework that helps to proactively listen and act upon weak signals (Schoemaker 2009: 81-82):

1st. Step: Scanning for weak signals
↓
2nd. Step: Sense making
↓
3rd. Step: Probing and acting

Table 2. Weak signals (Schoemaker 2009: 84).

Scanning for weak signals requires leveraging the whole network of intelligence. This includes customers, competitors, discussion forums

and colleagues. During this process, it is important to account for bias, prejudice and culture. Weak signals are easily overlooked or misinterpreted. *Sense making* requires a thorough analysis and interpretation of the data gathered. Utilising the wisdom of the markets or analysing hypothetical test cases can help achieve this. *Probing and acting* is the phase where one needs to confront the reality (Table 2). The example of the Royal Dutch Shell has all these elements embodied. The dependency on a single energy source was interpreted as risky. The company, however, faced this inconvenient reality and acted accordingly by researching and investing into alternative energy sources. Living in denial would have been more convenient for the time being, but fatal for the future (Schoemaker 2009: 83).

The case company will have to analyse the current developments in the industry and *make sense* of the data gathered, before developing new strategies. Frameworks for analysing the business environment (Porter 2008: 4) and elaborating on the business ecosystem (Lansiti 2004: 74) are discussed in Section 2.1; they help interpret the *week signals*.

2.3 Business Model Frameworks

Section 2.3 discusses business model theories and elaborates on the existing frameworks in order to develop a new business model framework, tailored for the case company. The literature reveals that there are different definitions for business models. A business model is *an architecture of product, service and information flows, including a description of the various business actors and their roles; a description of the potential benefits for the various business actors; a description of the sources and revenues* (Timmers 1998: 2). A business model further *depicts the content, structure, and governance of transactions designed so as to create value through the exploration of business opportunities* (Amit 2001: 511). According to Chesbrough

(2002: 529), a business model is *the heuristic logic that connects technical potential with the realisation of economic value*. Business models are *stories that explain how enterprises work,* and *a good business model answers Peter Drucker's age-old questions: Who is the customer? And what does the customer value?* A business model also answers the fundamental questions every manager must ask: *How do we make money in this business? What is the underlying economic logic that explains how we can deliver value to customers at an appropriate cost?* (Magretta 2002: 4) According to Morris (2005: 727), a business model is a *concise representation of how an interrelated set of decision variables in the areas of venture, strategy, architecture, and economies are addressed to create sustainable competitive advantage in defined markets*. A business model also *articulates the logic, the data and other evidence that support a value proposition for the customer, and a viable structure of revenues and costs for the enterprise delivering that value* (Teece 2010: 179). According to Casadesus-Masanell (2010: 195), a business model is *a reflection of the firm realised strategy*. According to Johnson (2003: 52), a business model *consists of four interlocking elements that, taken together, create and deliver value*.

Johnson's four elements (customer value proposition, or CVP, profit formula, key resources and key processes), Osterwalder's (2009: 18-19) *business model canvas*, and Chesbrough (2002) business model framework will lay the theoretical background for the new business model framework, developed in this Thesis for the case company.

Reasons for a new Business Model

Some companies manage to be successful with certain products, while competing companies, with seemingly comparable or even better products, struggle to stay in business. Successful products are often wrapped into a clever business model like the following examples illustrate: Gillette uses enormous marketing efforts to sell shavers. However, it is the blades that generate the revenue. The

> shavers are, simply a *vehicle* to sell more blades. Apple offers iTunes (a proprietary digital media player application) for free. ITunes is the *vehicle* for Apple to sell MP3 players and add-on services. (Johnson 2003: 51-52)

Business Model Framework for Service Business Companies

According to Johnson (2003: 54), a successful business model consists of four interlinking elements that create value for the customer as well as for the company. The *customer value proposition* (CVP) needs to be analysed together with the *profit formula*, the *key resources* and the *key processes* (Johnson 2003: 52). Osterwalder (2009) suggests a business model canvas that consists of nine elements: 1) key partners, 2) key activities, 3) key resources, 4) value proposition, 5) customer relationships, 6) channels, 7) customer segments, 8) cost structure, and 9) revenue streams (Osterwalder 2009: 18-19). Chesbrough (2002) suggests six elements: 1) value proposition, 2) market segment, 3) value chain structure, 4) revenue generation and margins, 5) position in value network, and 6) competitive strategy to transform technical inputs into economical outputs (Chesbrough 2002: 31).

The comparison of different business model theories reveals that Johnson's framework covers the most relevant aspects necessary to create a business model proposal for the case company, while being very concise and pragmatic. Hence, Johnson's four elements – 1) customer value proposition, 2) profit formula, 3) key resources, and 4) key processes – are chosen as basis for the tailored business model framework in this Thesis. Where necessary, the framework is complemented with relevant aspects of other business model theories, such as Osterwalder's *business model canvas* or Chesbrough's business model framework. Figure 7 illustrates the tailored business model framework, based on Johnson's four elements:

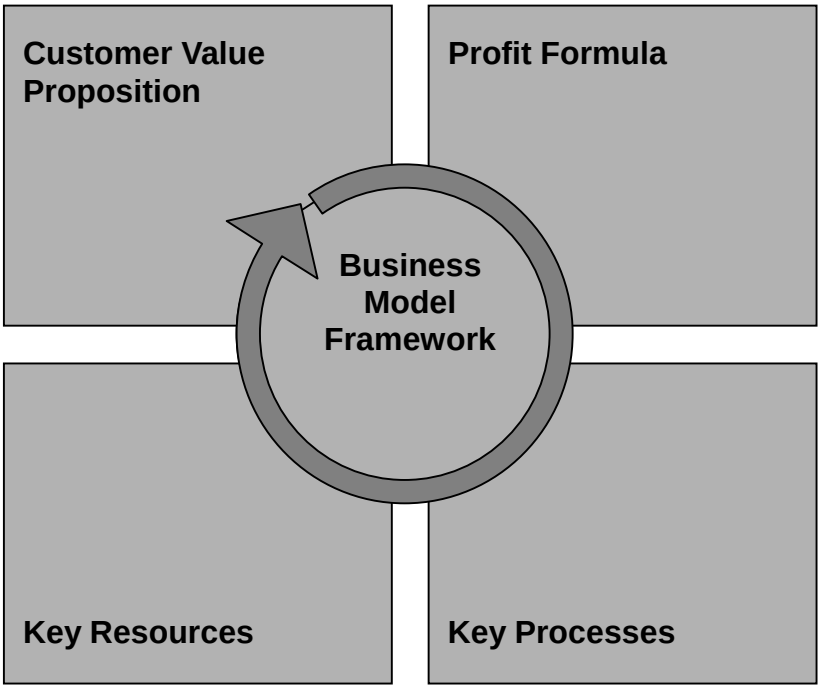

Figure 7. Business model framework (based on Johnson 2003: 54).

Figure 7 illustrates how customer value proposition, profit formula, key resources and key processes are interlinked. The four elements together constitute the business model (Johnson 2003: 54). These four elements are separately analysed and elaborated in the following Sections.

2.3.1 Customer Value Proposition

A customer value proposition describes the customer problem and the product that addresses the problem. Further, the customer value proposition describes the value of the product from the customer's perspective (Chesbrough 2002: 20). The customer value proposition is, according to Johnson (2003), the most significant element of the business model. Hence, it is important for a company to find a way to create value for the customer. The customer value proposition can be a service that helps the customer to get a critical task done. The customer will value a service offering, if the offering provides a solution to a critical task for the customer. Designing such a customer value proposition, however, is only possible, if the company

understands the customer's problems, the product, challenges, processes and the markets. This thorough understanding can be achieved, for instance, with a close collaboration between the customer and the service provider (Johnson 2003: 54). Table 3 lists questions that a good customer value proposition would address (Osterwalder 2009: 17-16):

What value do we deliver to the customer?
Which one of our customers' problems are we solving?
Which customer needs are we satisfying?
What bundles of products and services are we offering to each customer segment?

Table 3. Customer value proposition questions (Osterwalder 2009: 17-16).

The questions in Table 3 aim to analyse the customer value proposition (Osterwalder 2009: 17-16). According to Johnson (2003: 53), a good customer value proposition helps the customer to *get the job done*. Table 4 lists the possible criteria that can help the customer to offer the customer value proposition:

Newness	Does CVP offer something new?
Performance	Does CVP offer better performance?
Customisation	Does CVP offer more customisation?
Get the job done	Does CVP *Do the Job*?
Design	Does CVP offer good design?
Brand/status	Does CVP offer more status?
Price	Does CVP offer a good price?

...

Cost reduction	Does CVP help reduce costs?
Accessibility	Does CVP offer better accessibility?
Convenience/usability	Does CVP offer better usability?

Table 4. Customer needs (Osterwalder 2009: 23-25).

Table 4 illustrates how a customer value proposition can address various customers' needs that range from offering *lifestyle* to *performance* requirements (Osterwalder 2009: 23-25).

2.3.2 Profit Formula

The profit formula describes the cost structure and the target profit. In addition, the profit formula explores how the revenue is generated (Chesbrough 2002: 7). According to Johnson's business model framework, the profit formula is the second out of four elements and is the plan on how to make profit, while creating value for the customer. The revenue model, cost structure, margin models and resource velocity are tools that help analyse the profit formula (Johnson 2003: 52). The profit formula is illustrated in Table 5:

What is the income?
What are the variable costs?
What are the fixed costs?
Operating profit = income – (variable cost + fixed costs)

Table 5. Profit formula questions (based on Osterwalder 2009: 102).

Table 5 introduces a simple profit formula (based on Osterwalder 2009: 102). The operating profit is equal to the income minus the costs. The analysis of the income, variable costs and fixed cost provides a sufficient overview of the case company profit formula.

2.3.3 Key Resources

The key resources are the third element in Johnson's business model framework, while people, technology, products facilities, equipment, channels and brand are examples of possible key resources (Johnson 2003: 54). These resources represent the assets required to offer and deliver the customer value proposition, customer segments, channels, customer relationships and revenue streams (Osterwalder 2009: 17-18). Table 6 lists critical questions regarding the key resources:

What resources are needed to offer the customer value proposition?
What resources are needed to deliver the customer segments?
What resources are needed for the channels?
What resources are needed for the customer relationships?
What resources are needed for the revenue streams?

Table 6. Key resources questions (Osterwalder 2009: 17-18).

The questions, listed in Table 6, offer a framework to analyse the necessary key resources needed to offer the customer value proposition. These resources, however, not only concern the customer value proposition, but also relate to the channels, customer relation ships and revenue streams. (Osterwalder 2009: 17-18)

2.3.4 Key Processes

The key processes are the fourth and last element in Johnson's business model framework. For a company to be successful, it is crucial to have operational and managerial processes that allow seamless scale adjustment of the created value. Those processes range from the training, development, manufacturing, budgeting and planning to sales (Johnson 2003: 54). When moving from the manufacturing perspective to the service perspective, the general focus of management changes from producing technical solutions and key process to offering comprehensive services. (Grönroos 1990: 117-

118) Hence, Osterwalder (2009) suggests the following four questions to address the key processes (Table 7):

What key processes do our value propositions require?
What key processes do our distribution channels require?
What key processes do our customer relationships require?
What key processes do our revenue streams require?

Table 7. Key processes (Osterwalder 2009: 18-19).

The questions listed in Table 7 offer a framework to analyse the necessary key processes needed to offer the customer value proposition. These processes, however, not only concern the customer value proposition, but also relate to the channels, customer relation ships and revenue streams. (Osterwalder 2009: 17-18)

Customer Relationship Management

When moving from the manufacturing perspective to the service perspective, the focus of management changes from short-term transactions to long-term relationships (Grönroos 1990: 117-118). The indicators of a good customer relationship are trust, commitment, mutual goals, win-win environment, loyalty, balance and justice. (Paloheimo 2004: 69) Osterwalder's business model canvas describes the customer relationship as the element that delivers the customer value proposition (Osterwalder's 2009: 17). Customer relationships are very important for niche companies, such as the case company, where a positive word-of-mouth is essential to build trust. This Section, therefore introduces the concept of *net-promoter score*. The net-promoter score consist of only one simple question for the customer – *How likely is it that you would recommend us to a friend or colleague?* The results from this question are recorded on a scale from zero to ten. Companies that respond to the above question with a grade from nine to ten are considered *promoters;* while and companies responding with seven or eight are *passively satisfied*

customers or *passives*. The rest of the customers that respond to the above question between zero and six are *detractors*. Detractors are the customers, least likely to purchase or recommend a product, service or company and account for the negative *word-of-mouth*. The promoters, however, account for the positive word-of-mouth. Hence, the word-of-mouth phenomenon according to Reichheld (2006) is asymmetrical. He claims that a customer with negative experiences shares his story with ten people, while a customer with positive experiences shares his experience with only one person (Reichheld 2006: 73). The net-promoter score is, therefore, the percentage of promoters minus the percentage of detractors – a metric that happens to strongly correlate with the company's growth rate. While this correlation can be seen across various industries, the proportion factors might differ. Companies need to increase their net-promoter score systematically in order to enhance their growth. Obviously, there is a great interest in investing in profitable promoters. It is important to try and keep the customers happy. In addition, it might be worth thinking of how passively satisfied customers can become profitable promoters. Simply listening to the customer's concerns and making a few adjustments might be sufficient. Of bigger concern, however, are the detractors. It is important to investigate why profitable detractors are not happy. Sometimes, simple misunderstandings can be the cause of dislike and distrust. Detractors with marginal profitability should only be considered, if they have potential to become profitable promoters. Reichheld’s (2006) net-promoter score offers a simple framework that helps put the emphasis on profitable customers (Reichheld 2006: 75-76). The case company will have to analyse the current customer base and might even consider entering new markets (Porter 2008: 5-6).

2.4 Tailored Business Model Framework

Table 8 introduces a new business model framework applicable to the case company, developed, based on the existing business model frameworks (Section 2.3):

Customer Value Proposition	**Profit Formula**
– What value do we deliver to the customer? – Which of our customers' problems are we satisfying? – Which customer needs are we satisfying? – What bundles of products and services are we offering to each customer segment?	– What is the income? – What are the variable costs? – What are the fixed costs? *Operating profit =* *Income – costs*
Key Resources	**Key Processes**
– What resources are needed to offer the customer value proposition? – What resources are needed for the customer relationships? – What resources are needed for the revenue streams?	– What key processes do our customer value propositions require? – What key processes do our distribution channels require? – What key processes do our customer relationships require? – What key processes do our revenue streams require?

Table 8. Tailored business model framework (based on Johnson).

Table 8 illustrates the new tailored business model framework that lays the basis for the case company business model proposal. The framework is based on Johnson's four elements (customer value proposition, or CVP, profit formula, key resources and key processes),

using aspects of Osterwalder’s (2009: 18-19) business model canvas and Chesbrough (2002) business model.

3 METHOD AND MATERIAL

Business research is often related to practical challenges of organisations, marketing, financing or growth of business activities. Therefore, researchers often obtain their research questions from a practical, everyday business problem. Researchers actively engage and work with the business in order to help solve specific business problems. This can be done, for instance, by developing business or organisational activities or by seeking solutions to make business work more efficient and profitable. Research, where close collaboration is used to search for practical solutions, is often referred to as *action research.* Action research has proven suitable and effective when the research question aims to evaluate a series of actions that are applied over time to groups, organisations or communities. If the research question aims to understand a process of change, a development or an improvement to address an actual business challenge, while simultaneously learning from its results, action research is considered an appropriate method. (Eriksson 2008: 193-194)

3.1 Action Research

Action research has its roots in social psychology, but is also derives ideas from anthropological and social anthropological community studies where researchers have played an active role in the communities they researched. The gained knowledge from such studies enabled the researchers to tackle various kinds of problems. Many scientists have adopted action research as a specific research approach, for example, Kurt Levin (1890-1947), Elton Mayo (1880-1949) or William Foote Whyte (1914-2000). According to Kurt Levin, the key driving force of action research should not be the answer to theoretical problems, but rather a solution to a real-life problem. In that sense, action research draws closer to the realist paradigm, than the constructivist way of knowledge creation, and can be described as

enquiry *with* people rather than *on* people. Technically, action research is not a research method, but should rather be considered as a research approach (Eriksson 2008: 195). Action research model is a cyclical process of *planning*, *taking action* and *evaluating,* which leads to further planning (Eriksson 2008: 293). This particular approach was implemented in this study.

3.2 Research Implementation

The background study uses theories, frameworks and bodies of best knowledge to design a new business model framework. This framework lays the foundation for the research. The research model used in this particular study is illustrated in Figure 8.

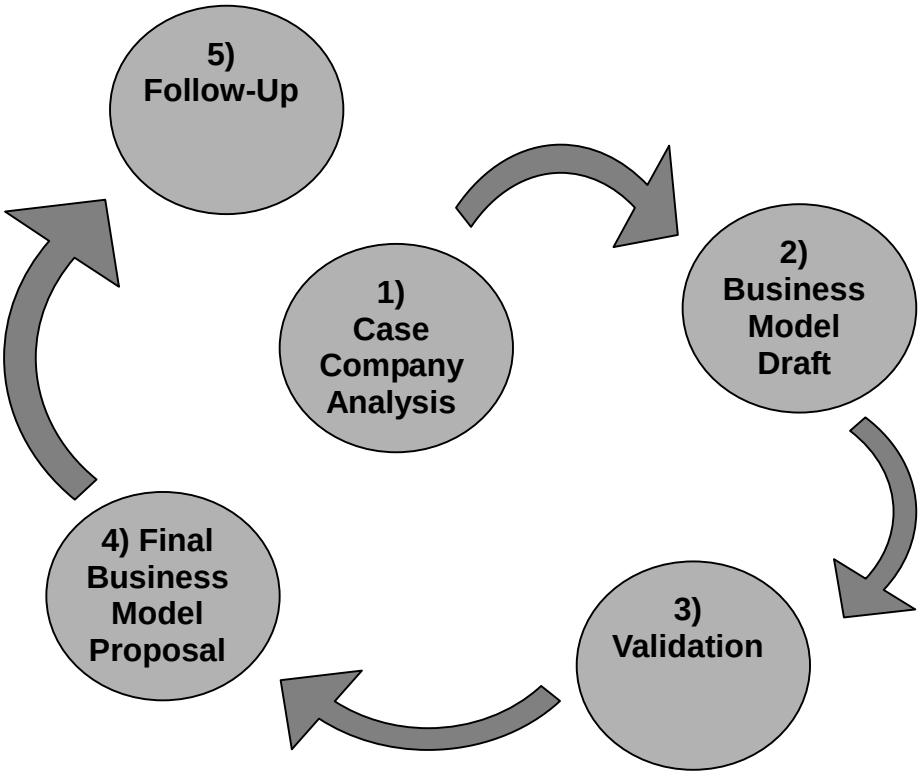

Figure 8. Action research model.

Figure 8 illustrates the action research phases conducted in this study:

1) **Case company analysis:** The research combines several methods and techniques of analysis to validate the findings. The material used to conduct the case company analysis utilises multiple sources of data such as a current state analysis, internal stakeholder interviews, peer interviews, a company benchmark and the researcher's observations. These sources ensure triangulation of data (Section 3.2.1).

2) **Business model draft:** The current business model is analysed and a business model draft is introduced, based on the new businesses model framework and the findings from the case company analysis (Section 3.2.2).

3) **Validation:** The business model draft is presented to the senior management. The feedback is used to verify the results (Section 3.2.3).

4) **Final business model proposal:** The final business model proposal is based on the business model draft and the feedback from senior management (Section 3.2.4).

5) **Follow-up:** The reflections on validity, limitations and following-up steps are discussed in phase 5 (Section 3.2.5).

3.2.1 Case Company Analysis

The case company analysis is a substantial part of this study. It is based on a current state analysis, internal stakeholder interviews, peer interviews, a company benchmark, and the researcher's own observations.

- Current State Analysis

The current state analysis of the company is based on public information and observation done by the researcher. While most of the information is of qualitative nature, some information, for instance, the development of wages and salaries (Appendix D) contains also quantitative data.

- Internal Stakeholder Interviews

The internal stakeholder interviews were conducted in order to analyse the company. The interviews (Appendix E) were carried out as semi-structured interviews, based on a questionnaire (Appendix A). The interviews were, first, transcribed (Appendix B), and then, analysed (Appendix C). The results are presented in a SWOT matrix. A SWOT analysis can be used to analyse business and environmental factors (Armstrong 2006). Two interviews were conducted in the company's head office with senior management, on January the 27th 2011. Interview 1 was conducted with the sales manager and interview 2 with the development/sales manager. The interviews lasted 25 and 18 minutes respectively and were held in a meeting room. The interviewees could speak free and undisturbed and the set-up of the interviews was relaxed, yet professional.

- Peer Interviews

Four peer interviews were conducted with the peers, working in the electronic design service team. The interviews were conducted as semi-structured interviews based on a questionnaire (Appendix A). The interviews (Appendix E) were recorded and analysed (Appendix C) and the results are presented in a SWOT matrix. The interviews were conducted over the phone during April 2011. The interviews lasted between 15 and 25 minutes. The interviewees could speak free, and the set-up of the interview was relaxed, yet professional.

- Benchmarking

Benchmarking is the process of systematically identifying, analysing, and adapting industries' best practices to improve an organisation's performance (Boxwell 1994). The aim of the company benchmark is to identify and analyse the industries' best practises. There are about 50 companies in Finland offering electronic design services. The biggest company employs more than 400 employees, while the smallest companies are run as one-man companies. The case company is compared against two established Nordic companies offering industrial wireless solutions. These two particular companies have been chosen because they offer industrial wireless solutions. Furthermore, they are currently expanding their business. This is in contrast to the overall trend observed in this particular industry. However, the companies are not publicly listed, and hence, there is no public financial information available to confirm the observations. The data of this benchmark is derived from publicly accessible sources and official publications.

- Observations

The researcher has more than 10 years of experience in the electronic industry and has worked in the case company for more than one year. The researcher has been actively engaged in the company's processes and has access to internal documents.

3.2.2 Business Model Draft

At this step, the current business model is analysed and a new business model draft is introduced. The results from the case company analysis are discussed and applied to the tailored business model framework. The proposed business model draft is based on aspects of service business theories and existing business model frameworks.

3.2.3 Validation

The business model draft was presented to the two internal stakeholders for validation. The interviews for the validation of the business model draft were conducted as unstructured interviews. The interviewees were asked to comment on the business model draft. The comments were recorded and analysed. The results are discussed in Section 6.1. The internal stakeholder interviews were conducted on the phone on April the 21st and April the 26th, 2011 (Appendix E). The interviews lasted 25 and 37 minutes respectively. The interviewees could speak free and undisturbed. The set-up of the interview was relaxed, yet professional.

3.2.4 Final Business Model Proposal

The final business model proposal is based on the business model draft. The findings derived from the validation phase were used to complement the business model. Further, the customer value proposition is introduced and managerial implications are proposed to help implement the final business model proposal

3.2.5 Follow-Up

The reflections on validity, limitations and follow-up steps are discussed in Section 7 (Discussions and Conclusions).

3.3 Reliability and Validity Considerations

The researcher's relations to the subjects studied need to be reported in order to increase credibility (Patton 1999: 1199). The researcher has been actively engaged in the company's processes and has access to internal documents. The researcher has more than 10 years of experience in the electronic, telecommunication and semiconductor industry and has worked in the case company for more than a year. The researcher has contributed to the electronic design service team as a consultant. In this role, the researcher has good visibility across all the company's functions. Further, the researcher has a good overall understanding of the stakeholder business. However, personal bias can be dismissed, because the researcher is not directly involved in the stakeholder business, which can be considered as improving the objectivity of the study.

Validity of Sources

Triangulation of qualitative data sources consists of comparing observational data with the data, for instance, obtained from the interviews. Analysing, what people say and what people say over the time or from different viewpoints, can verify the consistency of the data. This data do not have to provide converging results. The analysis of the differences, however, can provide more information and increase the reliability of the study (Patton 1999: 1195). The research combines several methods and techniques of analysis to validate the findings. Triangulation consists of different ways of collecting data. The case company analysis utilises multiple sources of data, such as the current state analysis, internal stakeholder interviews, peer interviews, company benchmarking and the researcher's own observations. Triangulation of these data types can enhance the degree of convergence, and hence increase the reliability (Patton 1999: 1194).

- Validity of Interviews

In the past, qualitative research interviews were labelled as not scientific. Science, in a wider context, is defined as the *metrological creation of new and systematic knowledge*. Therefore, an interviewing approach, which is reliable, repeatable and systematic, can be considered as scientific (Kvale 1996: 59-60). To ensure the quality of the collected data, this study applies Kvale's *seven stages of interviewing investigation*. The seven stages consist of: 1) *thematising*, 2) *designing*, 3) *interviewing*, 4) *transcribing*, 5) *analysing*, 6) *verifying,* and 7) *reporting* (Kvale 1996: 83). Two rounds of internal stakeholder interviews and one round of peer interviews were conducted in this study. The first round of internal stakeholder interviews was conducted before the peer interviews. To limit bias from the internal stakeholder interviews, the same questionnaire (Appendix A) has been used for conducting the internal stakeholder interviews and the peer interviews.

- Validity of Current State Analysis and Company Benchmark

The current state analysis and company benchmark are based on publicly accessible data as well as the researcher's observations. The researcher's objectivity described above minimises any possible bias for the interpretation and analysis of the data.

- Validity of Sources and Theories

The source and theory references used in this study are supporting the interpretation of the data, and hence, special attention is paid to the referencing of sources and theories.

4 CASE COMPANY ANALYSIS

The company analysis is a substantial part of this study. It is based on a current state analysis, internal stakeholder interviews, peer interviews, a company benchmark and the researcher's own observations. The case company analysis model is illustrated in Table 9:

Current State Analysis *Section 4.1*	**Stakeholder Interviews** *Section 4.2*	**Peer Interviews** *Section 4.3*	**Company Benchmark** *Section 4.4*
Analysis	SWOT	SWOT	Analysis
↓	↓	↓	↓
Conclusion	Conclusion	Conclusion	Conclusion
↓			
Overall Conclusion *Section 4.5*			

Table 9. Case company analysis model.

The case company analysis consists of four different types of data collection to ensure triangulation (Table 9). The conclusions from each analysis: current state analysis, internal stakeholder interviews, peer interviews and company benchmark, are summarised in Section 4.5.

4.1 Current State Analysis

The current state analysis aims to provide a comprehensive, in-depth examination of the company. The current state analysis elaborates on the company's current offerings and products, as well as its business ecosystem. The presented data are derived from public sources and the researcher's own observations.

4.1.1 Company Profile

The company is a small Nordic consultant and design house. The company is specialising in advanced microelectronics, embedded processing, software design and programmable logic design (such as field programmable gate arrays, FPGAs). Currently, the company employs about 40 experienced engineers. (Case company 2011)

Customer Value Proposition

The company offers hourly billable electronic design and consultant services (Case company 2011).

Vision

In the past, the company's vision was stated as follows:
– *Trusted partner for electronic design services* (Case company 2011).

The increasing demand in the field of industrial wireless solutions has led to the following, revision of the company's vision:
– *Solution provider in industrial wireless technologies* (Case company 2011).

Service Offerings

Over the years, the company has developed a broad selection of products such as prototyping platforms, software drivers and intellectual property (IP) cores (Case company 2011):

Signal processing: The company offers solutions in different areas of advanced microelectronics, such as wireless communication, radar, video, image and sound processing.

High-speed design: The company offers design services, utilising new technologies such as high-speed serial communication.

Video and graphics: The company offers services and expertise for industrial TFT-LCD display systems, IP cores for graphics acceleration and digital video broadcasting.

System-on-chip: The company offers system design, design implementation, synthesis and verification for systems-on-chip.

Embedded systems: The company offers design services for Linux or Microsoft CE and Qt.

Education: The company also offers customised training. The training focuses on digital design and architecture, such as FPGA and ASIC design and development.

Product Examples

The company has developed a range of products consisting of hardware, software and IP cores (Case company 2011):

- Wireless software-on-PC (SoPC) platform
- Display controller for embedded systems
- Video multiplexing platform
- High-speed signal processing platform
- High-speed FPGA prototyping platform.

Technological Expertise

The company has expertise in different fields of electronic design such as (Case company 2011):

- FPGA consulting, design and development
- ASIC consulting, design and development
- Radio & wireless consulting, design and development
- Wired communication consulting, design and development
- Software consulting, design and development
- Embedded systems consulting, design and development
- Electronic system-security consulting, design and development.

The broad portfolio of services, products and expertises, however, makes any particular specialisation difficult. As a result, maintaining the expertise and developing core competences has proved to be challenging.

End Markets

The company's portfolio of technical expertise, service offerings and products is interdisciplinary. The company offers solutions and consulting services to different industrial markets. All these markets have a potential demand for wireless solutions (Case company 2011):

Telecom: The company offers solutions and consulting services for high-speed serial communication, protocol handling and complex board layouts.

Aerospace and defence: The company offers solutions and consulting services for compact PCI, software defined radio (SDR), radar and radio equipment.

Medical: The company offers solutions and consulting services for hardware-accelerated image analysis.

Industrial: The company offers solutions and consulting services for FPGA or ASIC based product development.

Extended Business Environment

The company has entered into alliances and partnerships with major technological universities in the Nordic. Furthermore, the company has made partnerships with OEMs and EDA companies in the field of FPGAs and ASICs. These partnerships provided the company with access to the latest technology, development and design tools, as well as the training material. (Case company 2011)

Economy of Hourly Billable Electronic Consulting Services

Over the years, the company has generated profit manly from the hourly billable electronic consulting and design services. This business model has advantages, such as low risk or fast return on investments. However, this business model has reached its limits. The following graph illustrates the increase of wage and salary earnings over the past decade in the company's industry (Figure 9):

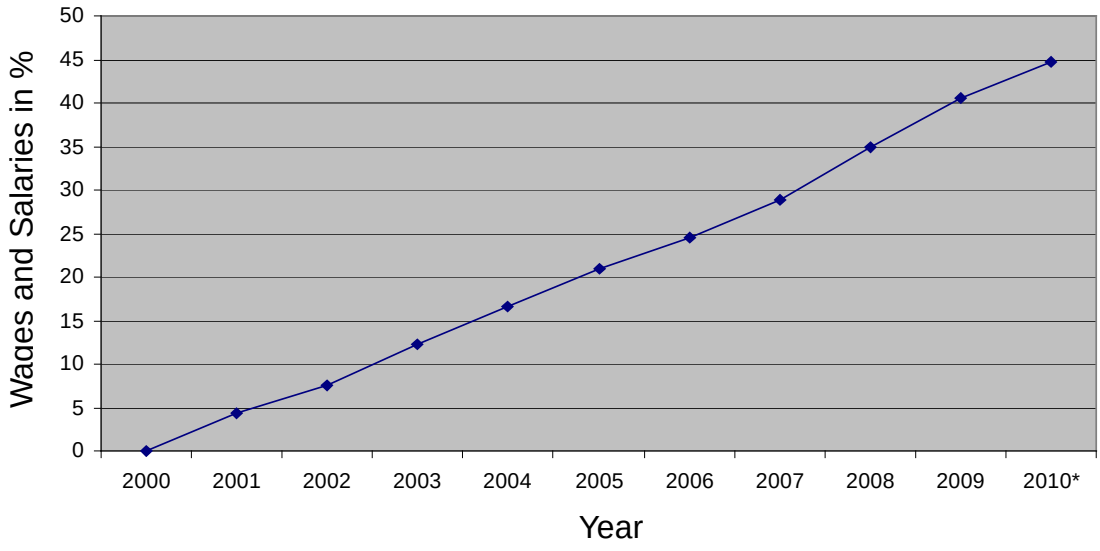

Figure 9. Wage and salary earnings (Finland Statistics 2011).

Figure 9 shows the wage and salary development over the past decade in Finland (*industry classification 74 → professional, scientific and technical activities: 74 → other professional, scientific and*

technical activities). In this industry, the wage and salary earnings have increased by almost 45% over the past ten years, while the rate for hourly billable electronic consulting services has maintained the same at best. There is a significant discrepancy between the industry's increasing wages and salaries, on the one side, and the stagnation of hourly rates, on the other. This discrepancy makes the business model of hourly billable electronic consulting services significantly less profitable compared to the time, when the company was founded. (Finland Statistics 2011)

4.1.2 Current State Analysis Conclusions

The current state analysis elaborated on the company *status quo*. The data for this analysis were based on public sources and the researcher's own observations. The current state analysis of the company has revealed its strengths, opportunities, weaknesses and threats, which are as follows:

Strengths

The company has developed a broad range of service offerings and products. Furthermore, the company has acquired very experienced personnel, with an average of over 10 years of experience in advanced microelectronics. Additionally, the company has gained considerable technological expertise in various industrial markets and established a base of partners such as OEMs, EDA companies and technological universities.

Opportunities

The company's senior management has observed an increasing demand for industrial wireless solutions over the past years. As a result, the company formulated a new vision: *Solution provider in industrial wireless technologies*. The employees' know-how in industrial wireless applications and experience in different industrial markets, paired with the company's products, can be considered a big asset.

Weaknesses and Threats

The company has generated profit manly from the hourly billable electronic design and consulting services. As a result, the employees, working on various customer projects, are physically located at the customer's site. The company's own products are developed during the employee's *idle time*, the time the employee is not assigned to customer projects. However, because of the nature of hourly billable electronic design and consulting services, it is challenging to assign the appropriate expertise to a project. Furthermore, it is becoming increasingly difficult to justify the funding for developing its own products because the employees do not generate any revenue during the time they develop the company's own projects.

The business model of hourly billable electronic design and consulting services buries almost no risk. Every hour spent at the customer site generates revenue for the company. Furthermore, this business model requires very little financial and organisational *overhead*, such as facilities or administrative expenses. Therefore, billable electronic design and consulting services are favoured over the seemingly expensive development of its own products. On the contrary, the development of the company's own products does not earn immediate revenue and buries significant risks. Although, own products, eventually, yield much higher return on investment for the company, according to the senior management, it is extremely difficult to justify sufficient funding for the development of such products.

The current business model seems to have many advantages, at first sight, but reveals many disadvantages by further consideration. There are, for instance, no personal development plans possible for the individual engineers, since the customers' assignments dictate the required skills. Hence, the company has no control to steer or cultivate the development of core competences. At the same time, the individuals are required to be extremely flexible in terms of assignments, localities and the training. In addition, the current

business model is economically not sufficiently rewarding. Despite the inflation, increasing costs, rents, wages and salaries, the hourly rates for electronic consulting services remained the same at best. In a globalised business environment, where design services are increasingly standardised and offshored, it becomes increasingly difficult to make profit with the current business model. The strategy, services, customer value proposition and ultimately the business model itself need to be adjusted to face the changes (Karmarkar 2004: 102).

The analysis of the internal stakeholder interviews revealed that the company's senior management has acknowledged this change in the business environment. Currently, the senior management is investigating in alternative business models utilising the results of this study.

4.2 Internal Stakeholder Interviews

The internal stakeholder interviews were conducted in the company's HQ. Senior management was interviewed in order to create an insight view and in-depth understanding in respect to the new vision. The individuals were interviewed to create an understanding of what this new vision means in practical day-to-day business. These interviews elaborated on the company's strengths, opportunities, weaknesses and threats.

The interviews were recorded, transcribed and analysed. The most significant statements were assigned to strengths, weaknesses, opportunities and threats (Appendix C). The line numbers of the statements in Appendix C correspond to the line numbers of the original transcription (Appendix B).

4.2.1 Internal Stakeholder Interview SWAT Analysis

The results from the internal stakeholder interview analysis (Appendix C) were used for the SWOT analysis (Figure 10):

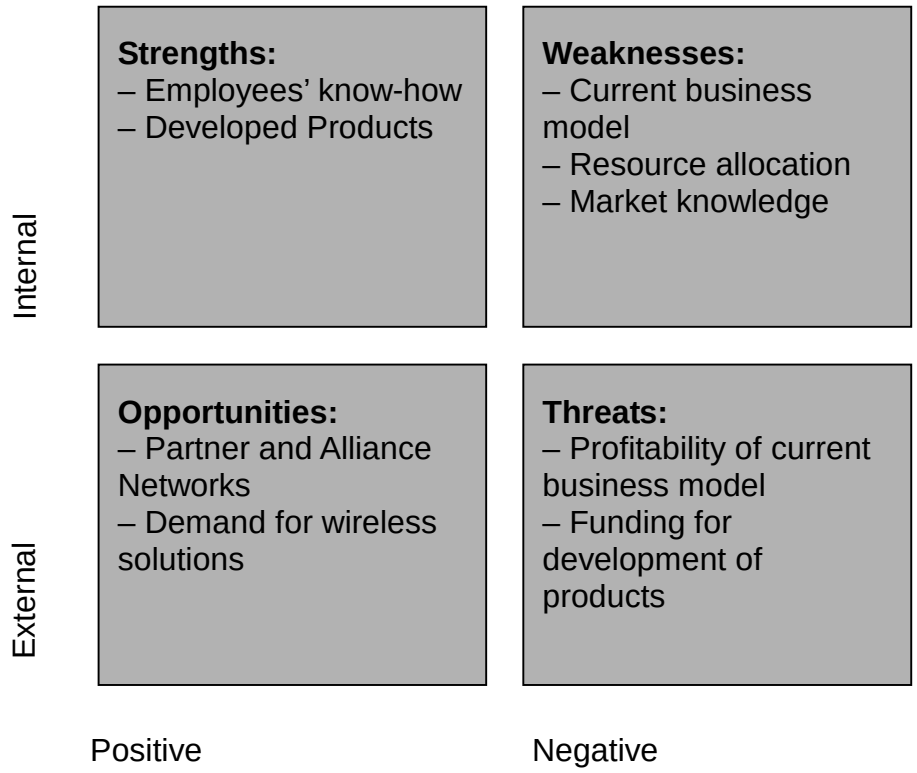

Figure 10. Internal stakeholder interview SWOT analysis.

As illustrated in Figure 10, the main findings from the above SWOT analysis indicate that the employees' know-how is seen as the company's biggest strength and asset. However, the current business model is seen as the biggest weaknesses. Alliances and partner networks and the demand for wireless solutions are seen as opportunities. Profitability and funding, however, are indicated as the biggest threats.

4.2.2 Internal Stakeholder Interviews Conclusions

The SWOT analysis of the internal stakeholder interviews has brought up two main concerns: the profitability of the current business model and the funding of its own products.

- Challenge 1: Profitability of the current business model

The current business model has reached the end of its lifetime. The hourly rates for consulting and design services have not increased during the last decade. However, the expenses, like salaries, have increased by almost 45% over the same time span. This finding aligns with the findings from the current state analysis. To address this challenge, the interviewees suggested offering specialised design services, add-on and embedded services and products. The funding for the development of the company's own products, however, has proven to be challenging (challenge 2).

- Challenge 2: Funding of own products

The development of its own products has proven to be commercially successful in the past, according to senior management. The development costs, however, are high and the time the products reach the break-even can take years. Further, there is no guarantee that the products will be successful. The company has increasingly struggled to justify the funding for the development of its own products.

4.3 Peer Interviews

The peer interviews were conducted among design engineers. The interviews were held over the phone. The design engineers were interviewed in order to create an insight view and in-depth understanding in respect to the new vision. The individuals were interviewed to create an understanding of what this new vision means in practical day-to-day business. These interviews elaborated on the strengths, opportunities, weaknesses and threats.

The interviews were recorded and analysed. The most significant statements were assigned to strengths, weaknesses, opportunities and threats (Appendix C).

4.3.1 Peer Interview SWAT Analysis

The most significant ideas and comments from the peer interview analysis were used for the SWOT analysis (Figure 11):

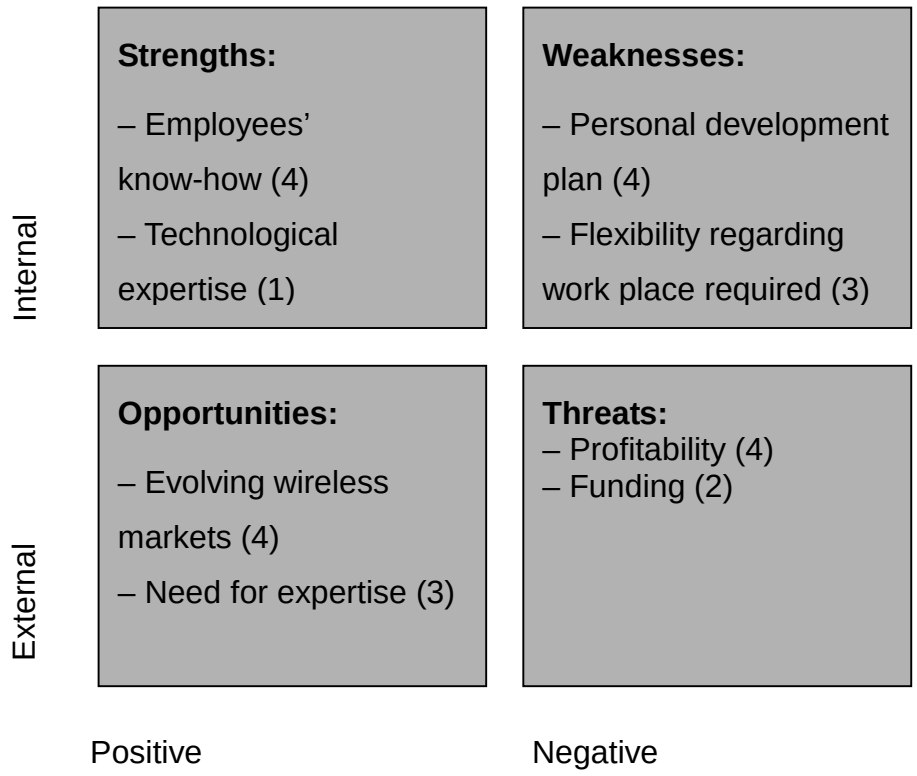

Figure 11. Stakeholder interview SWOT analysis.

Figure 11 illustrates the main findings from the peer interviews. The results from the SWOT analysis indicate that the employees' know-how is seen as the company's biggest asset. However, the lack of suitable personal development plans is seen as the biggest weakness. The increasing demand from the evolving wireless markets is seen as opportunity. However, the profitability of the current business model is seen as the biggest threat.

4.3.2 Peer Interviews Conclusions

The SWOT analysis of the peer interviews has shown that the results from the internal stakeholder interview analysis and the peer interview analysis are very similar to the strengths, opportunities and threats. The results for the weaknesses, however, differ significantly. The results indicate the employees' know-how (4 out of 4) is seen as the biggest strength. The profitability (4 out of 4) and funding (2 out of 4) are seen as the biggest threats. The increasing demand from the evolving wireless markets (3 out of 4) is seen as the biggest opportunity. The results for the weaknesses, however, indicate that the employees' concerns mostly regarded the personal development (4 out of 4) and the demanding work environment (3 out of 4). However, the internal stakeholder interviews indicated the hourly-based services and the difficulties to allocate resource as the biggest weaknesses.

The differences between the internal stakeholder interviews and peer interviews can be explained by the different viewpoints of the interviewees. Senior management and development engineers have a different level of insight on the processes and responsibility. Overall, the results from the peer interview supported the findings from the internal stakeholder interviews.

4.4 Company Benchmark

The aim of the company benchmark is to identify and analyse the industries' best practises. There are about 50 companies in Finland offering electronic design services. The biggest company employs more than 400 employees, while the smallest companies are run as one-man companies. The case company is compared against two established Nordic companies offering industrial wireless solutions.

4.4.1 Company Benchmark Analysis

These two particular companies have been chosen because they offer industrial wireless solutions. Furthermore they are currently expanding their business. This is in contrast to the overall trend observed in this particular industry. However, the companies are not publicly listed and hence, there is no public financial information available to confirm the observations. The data for this company benchmark are derived from public sources and official publications. The most relevant data for this company benchmark were analysed, and the results are listed in Table 10.

	Case company:	*Company A:*	*Company B:*
Employees:	~ 40	< 10	~ 60
Operating:	11 Years	15 Years	10 Years
Offices:	8 Offices	1 Office	3 Offices
CVP:	– Design services – Consulting	– From design services to manufacturing	– From design services to manufacturing
Alliances and partnerships:	– Universities – OEMs – EDA companies	– Partner network for complete design cycle, including manufacturing	– Partners for Manufacturing

Table 10. Company benchmark.

Table 10 displays the results of the company benchmark. The findings are further elaborated on displays in Section 4.4.2.

4.4.2 Company Benchmark Conclusions

The analysis of the benchmarked companies reveals that these three companies are similar in terms of their expertise and know-how attitudes, but differ in some other, important respects.

Alliance and Partner Networks

The case company has made R&D partners, such as technological universities, and established alliances with OEMs and EDA companies. On the contrary, company A and B's partnerships cover the whole product design and development cycle, including manufacturing. The case company has alliances and partnerships that strengthen the company's expertise and know-how. Company A and B, however, *complement* their core competence and leverage their know-how to create *synergies*.

Customer Value Proposition

Company A and B offer electronic design services for industrial wireless technologies, similar to the case company. The two companies differ from the case company, however, because they emphasise that their customer value proposition is more than electronic design services. The companies offer a *product* and *service package* that includes everything – project management, product definition, product design, prototyping, simulation, type approving, product maintenance, productisation and manufacturing services – for cost-efficient mass production in Asia.

Business Model

The case company analysis indicates the profitability as the biggest challenge of the current business model. Company A and B found the way to address this problem. The customer value proposition of company A and B allows for escaping this *profitability trap* by increasing the added value for the customer. The business models of company A and B allow for offering the add-on and embedded services, such as project management, product maintenance and

manufacturing services, alongside their actual products or design services. The business models of company A and company B might require more resources to accommodate the processes needed to offer their customer value proposition, but these services add considerable value to the customer value proposition. Hence, the services are not subject to the *normal* rates of hourly billable electronic consulting and design services. This is a significant difference to the case company business model.

4.5 Overall Case Company Analysis Findings

The material used to conduct the case company analysis utilises multiple sources of data such as internal stakeholder interviews, peer interviews, company benchmarking and the researcher's own observations. These sources ensure triangulation of the data. The case company analysis identified the following strengths, opportunities, weaknesses and threats (Table 11).

Strengths and opportunities of the current business model:
Low risk *(Sections 4.1 & 4.2)*: Customer carries the risk
Minimal investment *(Sections 4.1 & 4.2)*: Billable design services require minimal investments
Return of investment *(Sections 4.1 & 4.2)*: Almost immediate (invoice)
Industrial wireless solutions *(Sections 4.1 & 4.2 & 4.3)*: Increasing demand for industrial wireless solutions

...

Weaknesses and threats of the current business model:
Customer value proposition *(Sections 4.2 & 4.4)*: *Limited* according to the company benchmark
Profitability *(Sections 4.1 & 4.2 & 4.3)*: Price erosion of hourly rates
Funding *(Sections 4.1 & 4.2 & 4.3)*: Investments for new product development are difficult to justify
Leverage the know-how of the team *(Section 4.3)*: Employees are scattered around different customer sites
Service and strategy development *(Sections 4.2 & 4.4)*: Products, profit model, processes and resources are mostly under customer's control and ownership
Alliances and partner networks *(Sections 4.2 & 4.4)*: Alliances and partnerships do not complement the expertise and know-how but strengthen the core competence

Table 11. Overall case company analysis findings.

The strengths, opportunities, weaknesses and threats displayed in Table 11 are derived from the current state analysis, internal stakeholder interview analysis, peer interview analysis, company benchmark and the researcher's own observations. The weaknesses, concerning the profitability and funding, are discussed in the current state analysis (Section 4.1.2), as well as the internal stakeholder interviews (Section 4.2.2) and the peer interviews (Section 4.3.2). The company benchmark, however, brought to light some additional important aspects. The weaknesses regarding the alliances and partner networks and the customer value proposition are discussed in Section 4.4.2.

5 BUSINESS MODEL DRAFT

The business model draft, discussed in this Section, intends to address the challenges of the current business model. The challenges of the current business model are elaborated on the case company analysis, which consists of the current state analysis, internal stakeholder interviews, peer interviews, company benchmarking and the researcher's own observations. The results are summarised in Section 4.5. The business model draft is based on a business model framework tailored for the case company. The business model framework was developed in Section 2.3 and is summarised in Section 2.4. This business model is based on service business theories and business model theories, which suggest that a successful business model has to consist of four interlinking elements: *customer value proposition* (CVP), *profit formula*, *key resources* and *key processes* (Johnson 2003: 52). Those four elements lay the base framework for the business model draft. Aspects from Osterwalder's (2009) *business model canvas* and Chesbrough's (2002) business model framework are used to complement this business model framework, which is tailored for the case company needs.

5.1 Suggested Customer Value Proposition

The key for every successful business model is a good customer value proposition that offers a product or service and solves a customer problem. According to Osterwalder (2009), a customer value proposition should address the aspects like newness, performance, customisation, design, brand/status, price, cost reduction, accessibility or convenience/usability. Generally, a customer value proposition should *get the job done* for the customer (Osterwalder 2009: 23). Table 12 compares the current and suggested customer value proposition for the case company:

Current CVP:	**Suggested CVP:**
What value do we deliver to the customer?	
– Electronic design expertise (Case company 2011) – Manpower (Case company 2011)	– Help the customer improve their CVP
Which of our customers' problems are we solving?	
– Electronic design challenges (Case company 2011)	– Optimise time-to-market (TTM)
Which customer needs are we satisfying?	
– Offering skilled and experienced engineers (Case company 2011)	– Offering solutions, utilising synergies from existing and new partner and alliance networks, resulting in: – Increased agility and cost savings
What bundles of products and services are we offering to each customer segment?	
– Electronic design services (Case company 2011)	– Industrial wireless turnkey solutions containing: ***– Add-on/embedded Services*** *– Product maintenance (after-sales)*

Table 12. Suggested value propositions.

Table 12 illustrates the delivering of value to the customer by helping the customers to improve their CVP. The added value for the customer is realised in a form of improved time-to-market interval and reduced costs. The suggested customer value proposition utilises the synergies from the existing and new alliances and partner networks. Those networks create the opportunity to satisfy the customer needs such as agility and cost savings. The suggested customer value proposition offers industrial wireless turnkey solutions for the customer, covering the whole design cycle from the concept phase to the manufacturing. In this model, services, such as add-on and embedded services and product maintenance, will be developed alongside the products. The add-on and embedded services are a fixed element of the turnkey solutions.

5.2 Suggested Profit Formula

The profit formula is the plan on how to make profit while creating value for the customer (Johnson 2003: 52). Table 13 compares the current and suggested profit formulae by answering the following questions (Osterwalder 2009: 103):

Current profit formula:	**Suggested profit formula:**
What is the key income?	
– **Hourly rates x billable hours**	– Hourly rates x billable hours **+ service payments** **+ royalty payments**

...

What are the key variable costs?	
– **Hourly salary x billable hours** + Testing/demo/prototype platforms, lab equipment…	– Testing/demo/prototype platforms, lab equipment, product certification costs…
What are the key fixed costs?	
– Others (rent…)	**– Salaries** + others (rent …)

Table 13. Suggested profit formula.

Table 13 illustrates the difference between the current and suggested profit formulae. The suggested profit formula enables some additional sources of income, such as service payments or royalty payments. The variable costs in the current profit formula are relatively big and increase almost *proportionally* to the income. The following *simplified* equation illustrates that the operating profit in the current profit formula is proportional to the billable hours:

Current:
Operating profit = billable hours x (hourly rates – hourly salary)

Salaries and billable rates are determined by the industry. Hence, the only way to increase the operating profit is to increase the amount of billable hours. Therefore, the suggested profit formula intends to remove the billable hours from the equation. The income is increased (alternative revenue models) and the operating costs are reduced (productivity, re-use…) in order to increase the operating profit:

Suggested:
Operating profit = Σ of incomes – Σ of costs

Funding

Funding of the company's own product and service development is perceived as a significant challenge, according to the case company analysis (Section 4). Currently, the service engineers are the main revenue creators. However, developing its own products and services would *lock down* these resources. Hence, the suggested business model draft bypasses this challenge by suggesting industrial wireless turnkey solutions with add-on and embedded services. The turnkey solutions create the opportunity to develop additional expert services that create additional revenue. Further, the acquired know-how, experience and infrastructure (variable costs) can be re-used in upcoming projects and help reduce the company's operational costs.

5.3 Suggested Key Resources

The key resources are the third element in Johnson's (2003) business model framework. People, technology, products, facilities, equipment, channels and brand are all examples of key resources (Johnson 2003: 54). Resources represent the assets required to offer and deliver the customer value proposition (Osterwalder 2009: 17-18). Table 14 compares the current and suggested key resources for the case company:

Current key resources:	**Suggested key resources:**
What key resources are needed to offer the customer value proposition?	
– Skilled people – Equipment, facilities	– Alliance/partnership networks – Skilled people – Equipment, facilities

...

What key resources are needed for the distribution channels?	
– Sales/marketing resources – Flexible workforce	– Sales/marketing resources – Management resources
What key resources are needed for the customer relationships?	
– Sales/marketing resources – People (customer focus)	– Sales/marketing resources – Management resources
What key resources are needed for the revenue streams?	
– Business administration	– Strategy planning expertise – Contract/legal expertise

Table 14. Suggested key resources.

Table 14 illustrates the resources needed for the current and suggested business model. The most notable additions to the key resources, in comparison to the current business model, concern the alliances and partner networks and the personnel. The alliances and partner networks enable the offering of the suggested customer value proposition. These additional resources will be needed for managing the additional processes. The suggested key resources are tightly interlinked with the suggested key processes (Section 5.4).

5.4 Suggested Key Processes

The key processes are the fourth and last element in Johnson's (2003) business model framework. For a company to be successful, it is crucial to have operational and managerial processes that would

allow seamless scale adjustment of the created value. Those processes range from training, development, manufacturing, budgeting and planning to sales (Johnson 2003: 54). Table 15 compares the current and suggested key processes for the case company:

Current key processes:	**Suggested key processes:**
What key processes do our customer value propositions require?	
– HR processes (hiring) – Training processes	– Partner network management – Portfolio management
What key processes do our distribution channels require?	
– Sales/marketing processes – Processes for flexible employment arrangements	– Sales process – Channel partner network management – Services productisation management
What key processes do our customer relationships require?	
– Sales/marketing processes	– Customer relationship management (CRM) – Portfolio management

...

What key processes do our revenue streams require?	
– Accounting/invoicing processes	– Strategy planning processes – Contract/legal management

Table 15. Suggested key processes.

Table 15 illustrates the processes needed for the current and suggested business model. New key processes are required for the suggested business model draft. The additions to the new key processes, in comparison to the current business model, are necessary to ensure the seamless offering of the suggested customer value proposition (Osterwalder 2009). Further, the suggested key processes are tightly interlinked with the suggested key resources (Johnson 2003).

Benefits of the Suggested Business Model

The business model draft addresses the biggest challenges of the current business model, the profitability. The suggested business model addresses the current customer value proposition, the design and consulting services and the high development costs for the in-house development of products. The business model intends to propose an alternative business model that would leverage the internal R&D resources and activities by utilising outside partners. The results should transform the internal R&D results into a customer value proposition (Osterwalder 2009: 119). Furthermore, the development of the add-on and embedded services should create additional sources of income (Auguste 2006: 44). These concepts were crystallising during the background research, the case company analysis and discussions with peers and customers. The final, revised business model, the managerial implications and action plan for senior management are introduced in Section 6.

6 REVISED BUSINESS MODEL

The results from the case company analysis (Section 4) and business model draft (Section 5) were presented to the senior management for revision. Table 16 illustrates the model for the development of the final business model proposal:

Stakeholder Feedback Analysis (2nd round of internal stakeholder interviews) *Section 6.1*
↓
Final Business Proposal *Section 6.2*
↓
Management Implications *Section 6.3*
↓
Action Plan *Section 6.4*

Table 16. Business model development model.

The business model draft was verified with a second round of internal stakeholder interviews (Table 16). The feedback from the senior management was collected to develop the final business model proposal. In Section 6.3 and Section 6.4 respectively, the managerial implications are discussed and the action plan for senior management are introduced.

6.1 Stakeholder Feedback Analysis

The stakeholder feedback, resulting from the internal stakeholder interviews (2nd round) is used to validate the business model draft. The interviews where conducted as open interviews. The interviews were recorded and analysed (Appendix E). The involvement of the senior management increases the acceptance of the final business model proposal and improves *reliability*, *completeness* and *correctness*. The senior management mostly agreed with the findings from the case company analysis and the developed business model draft. According to the senior management, the business model draft addresses the most critical elements of the current business model, the profitability, by introducing a new customer value proposition and suggesting an alternative profit formula. Table 17 lists the most significant comments and additions:

…customers increasingly ask for fixed-price projects. Fixed-price projects, increases the risk for the company in the current business model. The suggested customer value proposition, however, helps to address this challenge <…> offering the whole design cycle, including manufacturing, helps to justify increased hourly rates and alternative revenue models...
…an analysis of the customers' business models would be nice to have, customers, namely big electronic firms, increasingly outsource services to sub-contractors – that has not always been the case – an analysis of the customers' business models could hep to act proactively upon future trends…

Table 17. Stakeholder feedback.

The feedback from the senior management has confirmed with the findings from the stakeholder interview analysis stated in Table 17. It was acknowledged that the suggested business model is not addressing the current challenge of *fixed-price projects*. Fixed-price

projects increase the risk for the company. Furthermore, the case company analysis does not refer to the customers' business models.

6.1.1 Conclusions

- It has been decided that the challenge of fixed-price projects will be addressed by the new improved customer value proposition and an alternative profit formula. Therefore, the challenges of fixed-price projects are covered in the business model draft.

- It has been decided that risk management and business intelligence processes will be added to the final business model proposal to address the missing analysis of customers' business models. This addition will be reflected in the managerial implications, namely the strategic management implications in Section 6.2.1. Its limitations are discussed in Section 7.1.

6.2 Final Business Model Proposal

Business models typically evolve according to certain patterns (Osterwalder 2009: 118-119). The case company fits best the pattern of the *open business model*. Its starting point is the decreasing profitability of the design services business and the high development costs for the in-house development of products and services. The open business model pattern suggests that the company can leverage the internal R&D resources and activities by utilising its outside partners. The internal R&D results would be transformed into a customer value proposition, offered to the customers. Acquiring external sources can help reduce the costs and improve the time-to-market interval (TTM). The open business model allows for utilising additional services and cutting edge technology. This can help improve the customer value proposition and increase the revenue (Osterwalder 2009: 118-119). Additional services, such as add-on and

embedded services, create additional sources of income (Auguste 2006: 44). Therefore, the final business model proposal suggests an *open business model*, which utilises a network of alliances and partnerships, as well as add-on and embedded services, to offer an improved customer value proposition (Table 18).

Customer value proposition	**Profit formula**
Help the customer improve their customer value proposition by: – **Optimise time-to-market (TTM) interval** – **Offering industrial wireless turnkey solutions with embedded services** Utilising synergies from existing and new alliance and partner networks, resulting in: – **Increased agility, and** – **Cost savings, and** – Cutting-edge technology	**Income:** Hourly rates x billable hours *– Increased hourly rates due to the added customer value* **+ Service contract payments** **+ Royalty payments** **+ Revenue from the add-on and embedded services** **Costs:** *– Reduced variable costs due to the increased productivity and profitability (re-use; simultaneous development of turnkey solutions and embedded services)* **Operating profit:** *= Σ of incomes – Σ of costs*

...

Key resources	**Key processes**
– Alliance/partnership networks	– Partner network management
– Management resources	– Contract/legal management – Services productisation management – *Risk management** – *Business intelligence processes**
– Skilled staff	– Personal development processes (training…) – Hiring processes
– Sales and marketing resources	– Sales process – Customer relationship management (CRM) – Portfolio/service management

Table 18. Final business model proposal overview.

Table 18 illustrates the overview of the new business model proposal based on Johnson's (2003) four elements: customer value proposition, profit formula, key resources and key processes. This overview of the business model proposal is derived from the business model draft. The additions, resulting from the stakeholder feedback analysis (Section 6.6.1) are indicated with asterisks (*).

Customer Value Proposition

The final business model proposal suggests a new, improved customer value proposition that addresses the company's vision of becoming a solution provider in wireless technologies. The new customer value proposition would deliver value to the customer by improving and increasing the customer's value proposition. Synergies from the existing and new alliances and partner networks are utilised to satisfy the customer needs for the increased agility and cost savings. Value is added for the customer by optimising the time-to-market (TTM) interval, increasing agility, reducing costs and offering solutions, which utilise the state-of-the-art, cutting-edge technology. The customer value proposition would offer industrial wireless turnkey solutions for the customers, covering the whole design cycle – from the concept phase to manufacturing. The add-on and embedded services, such as product maintenance or firmware updates, would be an element of the new customer value proposition and are as important as the product itself. Carefully designed add-on and embedded services would enable alternative and additional revenue models, while simultaneously increasing the customer value proposition (Auguste 2006: 44). The challenge of profitability, due to the diminishing hourly rates of electronic design services and fixed-price projects, can be addressed with an improved customer value proposition and profit formula. The new customer value proposition, however, requires utilising certain managerial tools. Section 6.3 elaborates on these managerial implications in detail.

Profit Formula

The profit formula derives from the customer value proposition. The increased value, added to the customer value proposition, creates an opportunity to justify higher hourly rates as opposed to the *standard* design services rates. The emphasis on the development of the add-on and embedded services creates the opportunity for alternative sources of income. Furthermore, offering manufacturing services,

create alternative revenue models that scale, for instance, with the volume of produced products. Examples of alternative revenue models can range from royalty payments to service contract payments. These important additional and alternative revenue models address the current challenge, described by one interviewee (Appendix B):

> …currently we earn money by using your brain just *once* for *one* customer (190-191) <…> hence the earning scales only 1:1 (207-208)…

The new business model creates a possibility to re-use the results of development, know-how, expertise and equipment. Furthermore, the business model proposal suggests to simultaneously develop turnkey solutions and add-on and embedded services (Auguste 2006: 44), to increase profitability and productivity (Schmenner 2004: 335).

Key Processes and Key Resources

A series of key resources and key processes are required to put the business model proposal into practice. All of the key resources and key processes concern management and are discussed in Section 6.3.

6.3 Managerial Implications

The managerial implications for the successful implementation of the business model proposal comprise strategic management, customer relationship management (CRM), partner network management and portfolio management.

6.3.1 Strategic Management

Management needs to find the ways to realign the strategy and re-design the processes of the company in order to address the current challenges (Karmarkar 204: 106-107). Strategic management has to analyse the competitive environment by asking the following questions

(based on Porter 2008: 4; Stakeholder feedback conclusion; Section 6.1.1):

- What are the existing competitors?
- Which company could become a competitor?
- Which technology could become a substitute for the existing customer value propositions?
- Are we competing with our partners/alliances?
- What are the bargaining powers of customers and partners?
- Is the customer business model changing? (Stakeholder feedback conclusion; Section 6.1.1)
- How do we address the changes? (Stakeholder feedback conclusion; Section 6.1.1)

Supporting Theories for Strategic Management

The elaborated service business theory in Section 2 provides a set of frameworks that help answer the above questions. Porter's (2008) *five competitive forces* and Lansiti's (2004) *business ecosystem matrix* are frameworks that help assess the business ecosystem and the competitive environment. Management will have to be aware of, what Schoemaker (2009) calls *week signals.* In addition, Karmarkar's (2004) *strategy matrix* provides a framework to support vital strategic decisions. The suggested three-step framework would address the concerns raised by the senior management (Stakeholder feedback conclusion; Section 6.1.1)

6.3.2 Customer Relationship Management

Customer relationship management plays a key role in the new business proposal. The aim of customer relationship management is to listen to the customer in order to co-create the *right* customer value proposition for the *right* customer. Customer relationship management

has to find answers to the following questions *together* with the customer (based on Osterwalder 2009: 17-18):

- What are the customers' problems?
- Which customers' problems are we currently satisfying?
- How can we add value to our existing/new customer value proposition?
- How can the customer value proposition be delivered?

Supporting Theories for Customer Relationship Management

The above questions need to be answered in *co-operation* with the customers. Only the customer has the necessary knowledge to answer these questions. The results are interlinked with considerations of strategic management (Section 6.3.1). The elaborated service business theory in Section 2 suggests that a close collaboration with the customer is vital to address these questions. According to Osterwalder's (2009: 17) business model canvas, the customer relationship is the element that delivers the customer value proposition. The customer should be involved as a *co-producer of services* (Vargo 2004: 5-6). Customer involvement provides the company with the necessary insight into the customers' problems. The company is operating in an economy of skill; therefore, the company has to co-operate with the customer (Karmarkar 2004: 101-102). Such co-operation provides the opportunity of knowledge creation and builds trust. According to Paloheimo (2004: 69), trust is an indicator for a good customer relationship. Trust creates the opportunity for open discussions with the customer. This helps to understand what the customer *really* needs. Furthermore, understanding the customer's markets and challenges allows the company to design profitable add-on and embedded services (Auguste 2006: 44). Managerial implications for add-on and embedded services will be elaborated on Section 6.3.4

6.3.3 Partner Network Management

The business model proposal suggests an *open business model* for the case company. (Osterwalder 2009: 118-119) The company can utilise the internal development resources and activities to leverage the development of its alliances and partner networks. Partner network management has to find answers to the following questions (based on Osterwalder 2009: 17-18):

- What existing alliance/partner networks do we have?
- What alliance/partner networks do we need to develop/deliver the customer value proposition?
- How to we build/maintain the required partner networks?
- How can we leverage the network and create synergies?

Supporting Theories for Partner Network Management

Senior management has to answer these questions in *co-operation* with the customers and partners. The elaborated service business theory described in Section 2 suggests that the answers to the above questions are of strategic significance. Therefore, the partner network management implications are tightly interlinked with the strategic management implications (Section 6.3.1). Porter's (2008: 4) five forces framework helps to elaborate on the competitive environment. The competitive environment can be addressed by creating synergies from the existing and new alliance and partner networks in order to position the company within the business ecosystem (Lansiti 2004: 74). In addition, Auguste's (2006: 44) concepts of add-on and embedded services, and services and Schmenner's (2004) considerations regarding profitability and productivity have their implications for partner network management.

6.3.4 Portfolio Management

Understanding the customer's markets and their challenges allows the company to offer a good customer value proposition (Johnson 2003). The aim of the portfolio management (or services productisation management) is to develop the product bundles *together* with the embedded services. Having a special focus on add-on and embedded services allows the company to increase profitability, by simultaneously utilising resources for product and service development (Schmenner 2004: 335). Portfolio management has to find answers to the following question (based on Osterwalder 2009: 17-18):

- What *bundles* of products and services are we offering to each customer segment?

Supporting Theories for Portfolio Management

Inventions in the ICT sector lead to a service revolution (Vargo 2004: 4). The future of skill-based economies lays in *embedded services* (Meuter 2000: 50). The add-on and embedded services can be developed in co-operation with the customer and help increase the customer value proposition. Furthermore, the add-on and embedded services create an opportunity for alternative revenue models (Auguste 2006: 44). Therefore, add-on and embedded services are the key element, which needs to be considered by portfolio management when developing bundles of products and services.

Limitations

Portfolio management is tightly interlinked with strategic management, customer relationship management and partner network management. In order to answer the above question, it is necessary to contemplate on the results of Section 6.3.1 throughout 6.3.3 first. The elaboration of the managerial implications, however, requires the involvement of customers and alliance partners. This study does not include the involvement of customers and alliance partners into its scope. These

limitations are discussed in Section 7.1. The action plan in Section 6.4 introduces a framework for the senior management to consider the managerial implications.

6.4 Action Plan

The action plan, illustrated in Table 19, introduces a framework for the senior management of the case company to consider:

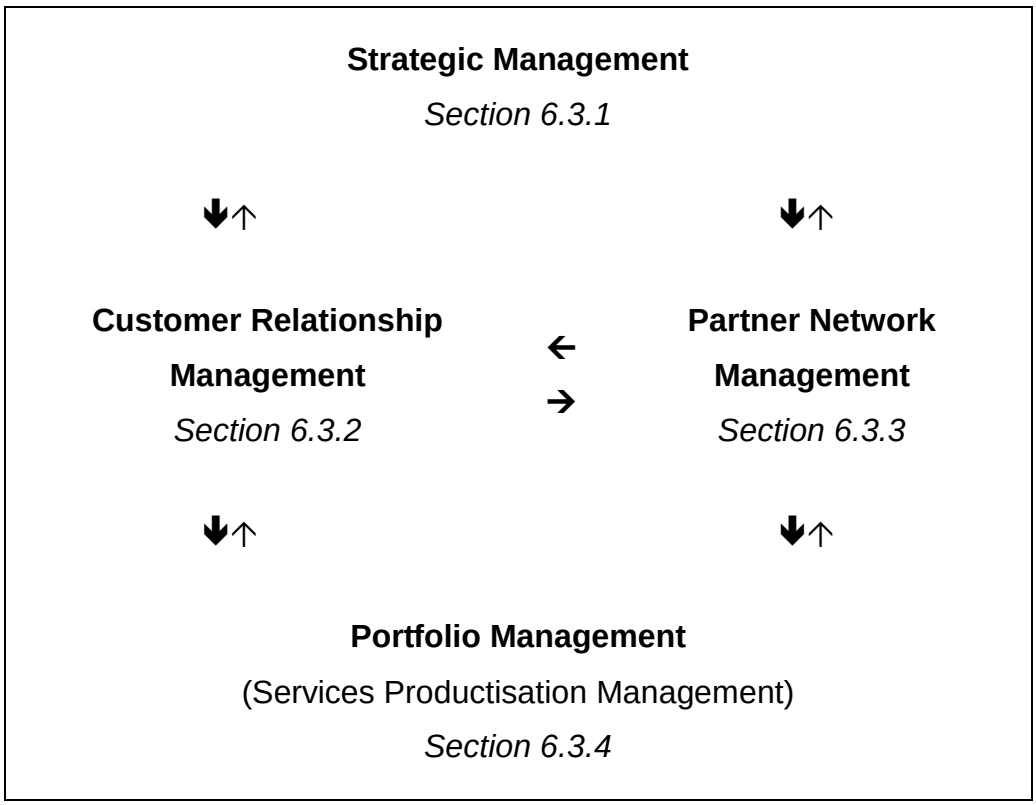

Table 19. Action plan.

The framework illustrated in Table 19 elaborates on the dependencies between strategic management, customer relationship management, partner network management and portfolio management. The action plan suggests the following steps:

1. The senior management has to make strategic decisions first. The analysed service business strategy (Section 2) and the results from the case company analysis (Section 4) provide frameworks necessary to elaborate on the strategic environment.

2. Customer relationship management and partner network management require the involvement of customers and alliance partners.

3. The resulting theoretical framework and the outcome from strategic management, customer relationship management and partner network management lay the foundation for the subsequent portfolio management. The portfolio management would define what *bundles* of products and services are to be offered to each customer segment.

7 DISCUSSION AND CONCLUSIONS

Wireless solutions have become part of everyday life in recent years. In industrial applications, wireless solutions provide an unprecedented form of flexibility, reduce complexity and save costs. The company's vision is to become a solution provider in industrial wireless technologies and offer electronic design and consulting services for industrial wireless applications. The company's biggest challenge is the profitability of the current business model.

To answer the research question, this study aimed to address the challenge by re-engineering a new business model. A new, tailored business model framework, based on existing business model frameworks, was developed to satisfy the needs of the case company. The case company analysis elaborated on the company's current state and business environment. The collected data from the case company analysis, and the elaborated aspects of service business theories, were used to formulate a business model draft. The senior management verified this business model proposal. The final business model proposal was complemented with the feedback from senior management.

The suggested final business model proposal is based on modern service business and business model theories, the case company analysis and existing expert knowledge. The business model proposal suggests an *open business model* (Osterwalder 2003: 119), leveraging the company's own R&D efforts by utilising new and existing alliance and partner networks. This would allow the company to improve the customer value proposition. Industrial wireless turnkey solutions, covering the whole design cycle from the concept phase to manufacturing, would improve the customer value proposition by optimising the time-to-market (TTM) interval, increasing agility, reducing costs and offering cutting-edge technology. Carefully designed add-on and embedded services would enable alternative

and additional revenue models, while increasing simultaneously the customer value proposition.

The final business model proposal elaborates and discusses on the managerial implications necessary, to successfully implement the proposed business model into practise.

7.1 Reflections on Reliability and Validity

Action research requires active engagement and work within the business in order to help solve specific business problems. Hence, personal bias cannot be avoided. However, the theoretical framework and the triangulation of sources intend to minimise personal bias. Furthermore, the researcher is not *directly* involved in the stakeholder business, which improves the objectivity of the study.

Objectivity

Different data sources were utilised to ensure triangulation. A second round of interviews was conducted to increase the reliability and to verify the findings. The sources and theory references used in this study are supporting the interpretation of the data, and hence, special attention is paid to the referencing. The analysis of the results, however, remains subject to the researcher’s objectivity.

7.1.1 Limitations

This Thesis aims to create reliable and valid results. Despite the efforts taken to increase the reliability and validity, the scope of this study has its limiting factors that can somewhat compromise the results. Hence, the following factors need to be taken into account:

- More interviews could increase the reliability of the results.
- More interview rounds could increase the validity of the results.
- Company external interviews (customers, partners, competitors) could increase objectivity.
- Analysing the external environment (customers, alliances, partners and competitors) could have added more grounded understanding of the business environment/ecosystem.
- Information from publicly listed companies could verify the observations.
- An extended company benchmark (different segments, competitors, different geographical location) could create more reliability.
- Piloting the business model proposal could increase the validity of the results.

The scope and time frame of this study did not allow for increasing the number of interviews. For competitive reasons, it has been decided that all the interviews should be conducted internally. Nonetheless, during the time this study has been conducted, the situation of the case company has changed which created a sensitive environment. It has been decided that no efforts should be taken in regard to further exploring external sources. To address the missing links, an action plan was suggested for senior management (Section 6.4).

7.2 Follow-Up

The scope of this Thesis was to re-engineer a new business model proposal. The final business model proposal introduced in this study will be presented to the senior management for revision and approval. However, due to the ongoing changes in the case company, it remains open whether, and to which extend, the business model proposal will be adopted. The action plan provides a framework for the senior management to consider the managerial implications, in case it will eventually be decided to pilot the business model.

Some aspects of the results stated in this Thesis, however, are applicable to different service providers in industrial wireless technologies and hence, it is hoped that parts of this Thesis will be implemented, although, in a slightly modified context.

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APPENDIX A: INTERNAL STAKEHOLDER INTERVIEW

QUESTIONAIRE

Date/place/time/interviewee: _____/_____/_____/_____
Introduction: Interview questionnaire for the internal stakeholders and peers.
Type of Interview: Semi-structured interview
Topic: New vision: Becoming a solution provider in industrial wireless technologies
Purpose: This interview will help to… 1) Identify the current status 2) Elaborate on the common understanding of the new vision 3) Probe into challenges and needs to put the new vision into practise 4) Collect the general ideas in regard to the new vision
Questions: 1) How far is the current strategy from the new vision? 2) What does the new vision mean to you personally? …in terms of commitment – importance – business model – product offerings… 3) What is needed in order to get there? …what kind of structure – processes – resources – product offerings – services… 4) What could be done/needs to be done to put the new vision into practice and make it a success?

Table 20. Appendix A – Stakeholder interview questionnaire.

APPENDIX B: INTERVIEW TRANSCRIPTIONS

INTERNAL STAKEHOLDER INTERVIEW 1

Interviewee:	**Sales Manager**
Date:	**27/01/2011**
Location:	**Company HQ**
Duration:	**25'13"**
Interview Type:	**Semi-Structured Interview**
Interview Topic:	**New Vision of Becoming a Solution Provider in Industrial Wireless Technologies**

How far is the current strategy away from the future strategy?

How far – interesting question – I must think – I suppose we have just started – in percentage I'd say we have done the first 30%

Do you mean in terms of working out the business model? 1'15"

Yes, we have some ideas – we have done some short of market research but then it has stopped – we had other things to do – the daily business <laugh> that's our biggest competitor, all the time – ah, we don't have full time staff working with strategies – it's the sales guys doing the strategy as well, and times are hectic right now and then we have to deal with something else but 1/3 is a good start – I think, we agree within the company about this wireless – we had to define what is wireless because every sales guy, and employee, has his own vision what wireless is.

So wireless has been decided but no details have been worked out? 2'12"

That's correct – then there is the other stuff, do we have the right organisation do we have the right staff etc. etc. etc. but that's what we have already done in the market study – ah – but it's a long way to go, still.

That leads me to the next question, how do you weight the importance to implement the new strategy? 2'30"

Interesting, yes – one thing about this business is, its changing very fast – as a vision we started with that 1.5 years ago – so we had to re-do the market study – its not solid at all – look what happens in Finland with XXX – results and shares were down again and also yesterday – we are living in the Nordic area so we are depended on XXX and YYY and the others – and if they are doing bad how is that affecting us – all this market plans, whether it is a product or new business case – you can spend so much time on that – you can spend months and years and when you are finished its old – so how can you then decide what to do – its not easy – if we get more business in the wireless area its natural to start to think of this every day and at all situations – then its easier to discuss about strategy and you learn the market, your customers, your competitors, what do they think, what do they

need – but we are not there yet – but we have a lot of wireless projects and it looks like it will be even more in the future – I think wireless is a good thing but what does it mean for the company?

If you speak of wireless, do you mean products or services? 4'50"

Definitely services, yes – design services, and I believe, to be successful we need some kind of platforms – just offering design services in wireless, what is that really? Today we sell the hardware and some basic PCB for interfacing but nothing else – but if we think of selling some intelligent hard or middle ware for wireless train services, we know that we need this kind of infrastructure – of course we don't do the application but some reference kit – that's our ambition, we discussed that – with our platforms we can do everything, we can go oscilloscopes, signal generators <…> we can do all that with our platforms. But this is the easier part to build the PCB than to build the software – to have the GUI for a full-blown instrument – that's a lot of work and we are not a software company (yet) so that's why we have to stay low, close to the hardware today, but we never know how it looks in the future.

Would this strategy also contain considering a partnership? 5'20"

Yes, I think a partnership is the best way to learn from others and see how we can work together, that's easier than having it in the same company – I think this is a key issue – of course we need to have some own software guys in house but for several years I can not see that we have that.

What needs to be done to get there? 6'02"

The challenges are the resources – we are a design house – we rent people by the hour – then we have these platform projects which need a lot of development and every time customers ask for minor modifications – and then we need resources and in these hectic times everyone is at the customer side and we have a problem with these platforms – so to be successful we need to have a basic organisation for these platforms, employees that work only for the platforms – it does not need ten but 2-3 full time employees and than we need to have, case by case, guys out in the industry for support and to gather feedback to see what's the demand – because if you sit in your office, you will loose touch, that's for sure – that's the challenge to have people working only on the platforms without generating any money – you take resources away from the consulting business, which is profitable, and put the money into platforms but there are always hassles like, *why goes the money to the product but not to me personally*. A better way for this development team is to have some external financing – maybe a big owner or something – I don't know – and you need a deadline – one – two years – it must be a project – then you don't have these quarterly hassles from management – financing I see as the biggest problem – that's exactly the problem we are having today – we have our platforms and customers ask for just small modifications but no engineers are available or they don't know the platforms.

So what would need to be tone to make the new strategy successful? 8'34"

I think we'd need some financing, we have had that in the history – the problem is developing the platforms – you can't do in halfe a year – for real products, when you are lucky, you reach break even after 5 years – that's how long the risk has to be taken to develop a product – I mean this numbers are for our business – in our difficult business it is 4-5 years minimum, before you can start making money. We, as a company had some budget – we said first for one year – then it was not enough – then the arguing starts and, ahh, yes <…> all our platforms are a result of this struggle against costs – our first platform reached 3.5 years – then it was break even – since over one year now it is money – extreme profitable – we sell it for a lot of money – so in a longer view it is very good money but sometimes it tales 2 years 3 years but you don't have the guaranty – now we work at the second platform and we have no guaranty whether and when we reach break even – we didn't know – the workaround is customer financing – the better strategy for our company would be, key customers that call as every year for new product development – so we get the basic financing for the platforms – maybe not all the money but maybe 50-70%. This bigger customers cannot be the best in every segment – so why not making a partnership with us.

But wouldn't platforms be kept very broad? 12'45"

Yes – if you look at out platforms, they are very broad – so many customers are using those platforms – so the idea is brilliant – really cool actually – but you know, we are so small – we are located in the Nordic, the marketing resources are not the biggest – so how can we reach out there – we also need distributors around the world – how should we penetrate the Japanese market for instance – and we need local support – the customer always wants local support – you need local guys you can trust – I don't think its impossible – I think its doable – but – <…> – I don't now what is needed from us – I think we need a new organisation, new people – and money – and we need the right contacts to get into these accounts to get this close relationship, so that we know every year they put a couple millions so that we can develop the next generation of platforms – that would be good for the customer for whatever they need it, but we can also sell it to other customers in other areas – not competing areas of course – that's my dream to have that…

Is that a concrete vision? 16'23"

No – yes – no – in my head yes – I can do it, but I have 100 other things to do in this company as you know – and it's the money to have dedicated resources – but the thing is – its not that much money actually – but for us it's a lot – but not in general – to reach to the big guys you need a business case – you need a nice power point presentation – a nice suit – you know – I can do the drawing on a napkin but then the customer wouldn't open the door – there is companies in the Nordic that moved a bit further then we did – so it is possible…

Do you see the consulting business as a legacy then? 20'50"

Yes – yes – correct! I think these platforms – I mean there is lots of internal discussion – whether we just should do this resources headcounts – the problem is that our hourly rates are nor rising – it's the opposite – how can we that way be part of the future – we have the same or lower rates than 10 years ago – salaries

123 124 125 126 127 128	are rising, inflation and all that – so how should we solve that – we need platforms and sell design services around that – than we are the experts – the customers don't complain about the hourly rates when we are the exports – we made some good money with that – that's the way forward – I don't say that we should do that 100% – but having these resources add an extra leg to rely on – that's my vision and that's what I think.

Table 21. Appendix B – Internal stakeholder interview 1.

INTERNAL STAKEHOLDER INTERVIEW 2

129 130 131 132 133 134 135	**Interviewee:** **Date:** **Location:** **Duration:** **Interview Type:** **Interview Topic:**	**Development/Sales Manager** **27/01/2011** **Company HQ** **18'34"** **Semi-Structured Interview** **New Vision of Becoming a Solution Provider in Industrial Wireless Technologies**
136	How do you see where the company is today in respect to the new vision?	
137 138 139 140 141	The skills and knowledge for each individual technology exists in consulting – and we know approximately enough about each individual sector and what to do with it – the problem is to merge the skills and knowledge from the individuals and merge it from one sector to another to apply it correctly on the market where you like to make the business	
142	So the resources are there. Is it about organising them?	2'12"
143 144 145 146 147 148 149 150 151 152	Organisation and market knowledge I would say yes – you need to have a certain critical mass in knowledge – market and customer knowledge – and you need to be able to find the opportunities – the question is not to have knowledge but to have critical knowledge and mass and also some solutions (at least on paper) for the customer so you can make them feel comfortable and also show that you are able to solve the problem for the customer – at least you need to do the thinking of what is needed – you need to have a rather large knowledge of what is the main problem and the main gain for the customer already when you meet them the first time otherwise they will not just swallow your message – you need to be able to speak their language	
153	Is it all about convincing the customer then?	3'26"
154 155 156 157 158 159 160 161	Yes, convincing the customer that the technology is available and the price is right and the earning factor is good as well because in most cases you ask them to invest in something that they might not be that knowledgeable in – but also it has to be scalable so that you can have a larger volume, so that more than just one customer can pay the development on a little more standardised solutions, otherwise its getting to expensive – for example if you are to implement Bluetooth for just one customer its going to be expensive but if its sitting in millions of mobile phones you can make it cheep.	

162	Should the company invest in new standards?	4’28”
163 164 165 166 167 168 169 170	As a consultant company you need to be the one that enables the market for the customer – especially if you like to sell solutions – you need to be aware of what happens and you need to be aware of the existing standards and solutions – but the idea could be to utilise the standards and the existing products in new markets – like wireless communication between mobile phones is quite obvious but wireless communication between sensors in an industrial side is not that much used yet and there are no common standards but in most cases you can base it on one standard and adapt it to a certain market – that could make sense.	
171	Do you see products there or services?	5’50”
172 173	Of course – the consultant business is add-on services – getting one foot into the door first and then getting paid over and over again, or isn’t it?	
174	So what’s needed to get there?	6’02”
175 176 177 178 179 180 181 182 183 184 185 186	You need to have the right customers, the right customer base and you need to have a rather good knowledge of the customers and you need to be able to convince them with some kind of platform that can prove the concept – no one buys a smart phone if you show it only on the paper. So you, your partner or some temporary business groups need to have something – you need to understand what is the need of the customer, what is my own knowledge and that of my partners in my network and the distributors and silicon providers and manufactures. Its difficult to be in all markets – I know that bigger companies have some ideas and we could help – if we can join with them we cannot only solve the problem at hand but solve the problem for a larger group and share the costs – so that would mean that we could make together business – so creating the right partnerships is important.	
187	How much are the finances constraining this?	9’04”
188 189 190 191 192 193	There is a number of ways to get paid – one is the per hour consultancy – one is solution based, another is products – I’d say at the end it’s very difficult in a global market to earn money by using your brain just once for one customer – you need to have the scalability – some kind of solution pre-packaged, scaled and re-usable blocks and solutions are needed – or maybe you need to get further making platforms and standard systems using revenue based payment.	
194	So the solution is moving away from consulting?	10’20”
195 196 197 198	Of course, of course – you are delivering so much more than just your hours – if you try to cut out a piece of your brain every time you do business, you get very stupid in the end because you are running out of your resources – that’s what you do as a consultant I think!	
199	Isn’t there a conflict between the existing consulting and your vision?	12’13”

200	I think you need to decide whether you want to deliver services per hour or
201	delivering value for the customer – do you want to be paid hour based or value
202	based – I think this is the main question – a mindset change is necessary but the
203	problem is that hourly paid business need less investment than the more
204	complicated business models by, for instance, making your own products – but
205	financing is a question of how much you want to give control into the hands of
206	those that have the money – hourly based is easier but other business models
207	have more potential – its very difficult to be a global distribution of services if you
208	have only a handful of consultants – they travel a lot and the earning scales only
209	1:1.

Table 22. Appendix B – Internal stakeholder interview 2.

APPENDIX C: INTERVIEW ANALYSIS

INTERNAL STAKEHOLDER INTERVIEW ANALYSIS

Interview Statements:	**Comments:**
…we had also other things to do – the daily business <…> we don't have full time staff working with strategies – it's the sales guys doing the strategy as well, and times are hectic right now (13-15) <…> you can spend months and years [on a strategy] and when you are finished its old (32-33) <…> we have our platforms and customers ask for just small modifications but no engineers are available or they don't know the platforms (60-61) <…> I can do it, but I have 100 other things to do in this company (111-112)…	**Weakness:** Resource Allocation Commitment
…I think, we agree within the company about this wireless (16-17) <…> if we get more business in the wireless area its natural to start to think of this every day and at all situations (33-34) <…> I think wireless is a good thing but what does it mean for the company (39-40)…	**Strength:** Wireless
…I believe, to be successful we need some kind of platforms – just offering design services in wireless, what is that really (41-42) <…> today we sell the hardware and some basic PCB for interfacing but nothing else (43-44) <…> to be successful we need to have a basic organisation for these platforms (63-64) <…> we need platforms and sell design services around that – than we are the experts – customers never complain about the hourly rates when we are the exports (123-124)…	**Opportunity:** New Services

…I think a partnership is the best way to learn from others and see how we can work together, that's easier than having it in the same company – I think this is a key issue (54-56)…	**Opportunity:** Alliances
…the challenges are the resources – we are a design house – we rent people by the hour – then we have these platform projects which need a lot of development and every time customers ask for minor modifications – and then we need resources and in these hectic times everyone is at the customer side and we have a problem with these platforms (59-63) <…> that's the challenge to have people working only on the platforms without generating any money – you take resources away from the consulting business, which is profitable, and put the money into platforms but there are always hassles (68-70)…	**Weakness:** Resource Allocation Funding
…for the development team we need external financing – maybe a big owner or something – I don't know – and you need a deadline – one two years – it must be a project (72-74) <…> all our platforms are a result of this struggle against costs (85-86)…	**Threat:** Funding
…the problem is developing the platforms – you can't do in halve a year – maybe 5 years before you can start making money (79-83) <…> but now it is money – extreme profitable – we sell it for a lot of money – so in a longer view it is very good money – very good! (87-88)…	**Threat:** Profitability
…I don't now what is needed from us – I think we need a new organisation, new people – and money – and we need the right contacts to get into these accounts to get this close relationship (103-106)…	**Threat:** Funding

…the problem is that our hourly rates are not rising – it's the opposite – how can we that way be part of the future – we have the same or lower rates than 10 years ago (120-122)…	**Threat:** Profitability
…skills and knowledge for each individual technology exists in and we know approximately enough about each individual sector and what to do with it (137-138)…	**Strength:** Know-how
…you need to have a certain critical mass in knowledge – market and customer knowledge (143-144) <…> the question is not to have knowledge but to have critical knowledge and also some solutions, at least on paper (145-146)…	**Weakness:** Market knowledge
…you need to have the right customers, the right customer base and you need to have a rather good knowledge of the customers and you need to be able to convince them with some kind of platform that can prove the concept (175-177) <…> I know that bigger companies have some ideas and we could help (182-183)…	**Opportunity:** Demand
…I'd say its very difficult in a global market to earn money by using your brain just once for one customer – you need to have the solutions pre-packaged, scaled and re-usable blocks (189-192) <…> you are delivering so much more than just your hours – if you try to cut out a piece of your brain every time you do business you get very stupid in the end because you are running out of your resources (195-197)…	**Weakness:** Hourly-based design services

Table 23. Appendix C – Internal stakeholder interview analysis.

PEER INTERVIEW ANALYSIS

Interview 3	*Interview 4*	*Interview 5*	*Interview 6*
Strengths:			
– Employees' know-how	– Employees' know-how – Technological expertise	– Employees' know-how – Technological expertise	– Employees' know-how
Opportunities:			
– Evolving wireless markets	– Need for expertise	– Evolving wireless markets – Need for expertise	– Evolving wireless markets – Need for expertise
Weaknesses:			
– Personal development plan – Flexibility regarding work place – Resource allocation	– Personal development plan – Need to act as trouble-shooter	– Personal development plan – Flexibility regarding work place	– Personal development plan – Flexibility regarding work place
Threats:			
– Profitability	– Profitability – Funding	– Profitability	– Profitability – Funding

Table 24. Appendix C – Peer interview analysis.

APPENDIX D: STATISTICAL DATA

WAGE AND SALLARY EARNINGS

Index of wage and salary earnings 2000=100 for industry 74 (Standard Industrial Classification 2002) and Consumer price index 2000=100

Year	A	B	(Annual averages)
2000	100	100	
2001	104.3	102.57	
2002	107.6	104.18	
2003	112.3	105.1	
2004	116.6	105.29	
2005	121	106.2	
2006	124.5	108.07	
2007	128.9	110.78	
2008	134.9	115.28	
2009	140.6	115.29	
2010*	144.7	116.69	

A – Index of wage and salary earnings 2000=100 (74 Other business activities)
B – Consumer price index 2000=100

Tilaston kuvaus	http://tilastokeskus.fi/meta/til/ati.html
Laatuselosteet	http://tilastokeskus.fi/til/ati/laa.html
Käsitteet ja määritelmät	http://tilastokeskus.fi/til/ati/kas.html
Tilaston kuvaus	http://tilastokeskus.fi/meta/til/khi.html
Käsitteet ja määritelmät	http://tilastokeskus.fi/til/khi/kas.html
Laatuselosteet	http://tilastokeskus.fi/til/khi/laa.html
Menetelmäselosteet	http://tilastokeskus.fi/til/khi/men.html

Table 25. Appendix D – Wage and salary earnings.

APPENDIX E: INTERVIEW SCHEDULES

INTERVIEWS

Internal Stakeholder Interviews: Semi-Structured Interview – Company HQ			
Interview 1	Sales Manager	(10)	27/01/2010 ~18’
Interview 2	Dev./Sales Manager	(4)	27/01/2010 ~25’
Peer Interviews: Semi-Structured Interview – Phone Interview			
Interview 3	Design Engineer	(2)	18/04/2010 ~15’
Interview 4	Design Engineer	(8)	18/04/2010 ~20’
Interview 5	Design Engineer	(10)	18/04/2010 ~17’
Interview 6	Design Engineer	(9)	19/04/2010 ~25’
2nd Round (Internal Stakeholder Interviews): Unstructured Interview – Phone Interview			
Interview 1a	*See Interview 1*		21/01/2010 ~26’
Interview 2a	*See Interview 2*		26/01/2010 ~37’
(*) = Years of work experience in case company			

Table 26. Appendix E – Interview schedule.